

---

# Appendix G

## Agency Consultation

## **SHPO Concurrence**

**OFFICE OF HISTORIC PRESERVATION  
DEPARTMENT OF PARKS AND RECREATION**

1725 23<sup>rd</sup> Street, Suite 100  
SACRAMENTO, CA 95816-7100  
(916) 445-7000 Fax: (916) 445-7053  
calshpo@parks.ca.gov  
[www.ohp.parks.ca.gov](http://www.ohp.parks.ca.gov)



October 12, 2015

In Reply Refer To: COE\_2015\_0916\_001

Lisa M. Gibson  
Regulatory Permit Specialist, Regulatory Division  
Department of the Army Corps of Engineers  
U.S. Army Engineer District, Sacramento  
1325 J Street  
Sacramento, CA 95814-2922

Re: Section 106 Consultation for the Panoche Valley Solar Farm Project, San Benito County (USACE SPK-2009-00443).

Dear Ms. Gibson:

Thank you for your letter received September 16, 2015 initiating consultation on the above referenced undertaking to comply with Section 106 of the National Historic Preservation Act of 1966 (as amended) and its implementing regulation at 36 CFR Part 800. The Army Corps of Engineers (COE) is considering issuing a Clean Water Act Section 404 permit to Panoche Valley Solar (Applicant) to place fill materials in waters of the U.S. The Applicant proposes developing a solar facility on 2,506 acres as well as upgrading the existing Panoche-Moss Landing 230kV transmission line to support connection to the electrical grid. Additional on-site and off-site acreage will be managed as conservation lands. The COE has defined the Area of Potential Effects (APE) as the permit area which includes approximately 4,717 -acres for the solar facility and conservation lands (2,506 of which will be developed into the solar facility), 523 acres for the telecommunication upgrade areas, and 57.76 acres for the off-site conservation lands.

Along with your letter, you submitted the following supporting documents:

- *Panoche Valley Solar Farm Project Cultural Resource Survey Final Report, San Benito County California.* (POWER Engineers with contributions by Far Western Anthropological Research Group, Inc. and JRP Historical Consulting. LLC 2010)
- Six supplemental Cultural Resources Inventory reports prepared by Natural Investigations Company (2014-2015)

Efforts to identify historic properties began in 2010 and continue to the present. These efforts included several field investigations, historical research, and consultation with Native American Tribes. The COE has consulted with the Amah Matsun Tribal Band, including the Applicant's consultant having a field review with a tribal representative. Your submittal details consultation with Mr. Ed Ketchum of the Amah Matsun Tribal Band regarding whether a plant traditionally used by his people was present in the project area. After consultation, COE determined the plant was likely either common reed (*Phragmites australis*) or Giant wild rye (*Elymus condensatus*) neither of which occurs on the proposed project site.

The COE has identified the following properties within the APE and has made the following determinations of eligibility to the National Register of Historic Places:

<b>Designation</b>	<b>NRHP Status</b>
Panoche 01, Ranch Complex	Not Eligible
Panoche 02, Water Diversion Structure	Not Eligible
Panoche 03, Ranch Features (trough, corral)	Not Eligible
Panoche 04, Ranch Complex(residence, tankhouse, outbuildings)	Not Eligible
Panoche 05, Moss Landing-Panoche 230 kV Electrical Transmission Lines	Not Eligible
P-10-005463, Isolated Handstone	Not Eligible
P-10-005835, Isolated Porcelain Fragment	Not Eligible
P-10-005887, Chaney Ranch Buildings (two groups of farm/ranch residences)	Not Eligible
P-10-006013, Panoche Substation	Not Eligible
Panoche Road Bridge (Bridge no. 42-0248	Not Eligible (Previous SHPO concurrence)
Historic-era Refuse Deposit (NIC 2015-02)	Not Eligible
CA-FRE-46 (P-10-0046), Prehistoric Lithic Scatter	Treat as Eligible

**I concur** with the above determinations of eligibility.

Your submittal explains site CA-FRE-46 is a lithic scatter located approximately 21 meters inside the northern boundary of the APE for Study Area 6 of the telecommunication upgrade area. No documented archaeological testing has occurred at this site. The site is located approximately 100 meters from the closest temporary (75-foot by 75-foot) wire pull site within the transmission right-of-way in Study Area 6; however, the COE has determined that the site will not be directly or indirectly impacted by the proposed telecommunication service improvements.

In a follow up conversation on October 9, 2015, you explained that, given the general sensitivity of the area, the COE will require archaeological monitoring of initial grading as a permit condition. Additionally, the Applicant has stated they will have Native American monitors for work within 200 meters of the creek and any other sensitive areas. I appreciate this responsiveness to tribal comments and attention to cultural resources.

The COE has concluded that issuing a permit would have no effect on historic properties and has requested my review and comment. I have the following comments:

- Pursuant to 36 CFR 800.4(b), I find that the COE has made a reasonable and good faith effort to identify historic properties within the area of potential effects.
- Pursuant to 36 CFR 800.4(d)(1)(i), **I do not object to a finding of no historic properties affected for this undertaking.**

Thank you for seeking my comments and for considering historic properties in planning your project. Be advised that under certain circumstances, such as unanticipated discovery or a change in project description, the COE may have additional future responsibilities for this undertaking under 36 CFR Part 800. If the COE requires additional information, please contact Anmarie Medin of my staff at (916) 445-7023 or [Anmarie.Medin@parks.ca.gov](mailto:Anmarie.Medin@parks.ca.gov).

Sincerely,

A handwritten signature in blue ink, appearing to read 'Julianne', followed by a long horizontal line.

Julianne Polanco  
State Historic Preservation Officer

## **401 Water Quality Certification**

## Central Valley Regional Water Quality Control Board

15 October 2015

Eric Cherniss  
Panoche Valley Solar, LLC  
845 Oak Grove Ave., Suite 202  
Menlo Park, CA 94025

### **CLEAN WATER ACT §401 TECHNICALLY CONDITIONED WATER QUALITY CERTIFICATION FOR DISCHARGE OF DREDGED AND/OR FILL MATERIALS FOR THE PANOCH VALLEY SOLAR FACILITY PROJECT, WID#5C35CR00002, SAN BENITO COUNTY**

This Order responds to the 4 November 2014 application and the 30 January 2015 revised application submitted by Panoche Valley Solar, LLC (Applicant) for the Water Quality Certification of construction and operation of a solar photovoltaic energy generating facility project permanently impacting 0.121 acres of waters of the United States. Additionally, 0.096 acres of waters of the United States will be impacted by compensatory mitigation activities on the Panoche Valley Solar Facility Project (Project) mitigation sites.

This Order serves as certification of the subject Project permitted by the United States Army Corps of Engineers' Individual Permit under § 401 of the Clean Water Act, and a Waste Discharge Requirement under the Porter-Cologne Water Quality Control Act and State Water Resources Control Board Order 2003-0017-DWQ.

### **WATER QUALITY CERTIFICATION STANDARD CONDITIONS:**

1. This Certification is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to § 13330 of the California Water Code and § 3867 of Title 23 of the California Code of Regulations (23 CCR).
2. This Certification is not intended and shall not be construed to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed pursuant to 23 CCR § 3855(b) and the application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.
3. The validity of any non-denial certification action shall be conditioned upon total payment of the full fee required under 23 CCR § 3860.
4. In the event of any violation or threatened violation of the conditions of this Certification, the violation or threatened violation shall be subject to any remedies, penalties, process, or sanctions as provided for under State law and § 401 (d) of the federal Clean Water Act. The applicability of any State law authorizing remedies, penalties, process, or sanctions for the violation or threatened violation constitutes a limitation necessary to ensure compliance with this Certification.

## WATER QUALITY CERTIFICATION GENERAL CONDITIONS:

1. Certification is valid for the duration of the Project described in the attached "Project Information Sheet." This Certification is no longer valid if the Project (as summarized in the "Project Information Sheet" and described in the water quality certification application) is modified, or coverage under the project permit issued by the U.S. Army Corps of Engineers pursuant to § 404 of the Clean Water Act has expired.
2. The Applicant shall provide a Notice of Completion (NOC) no later than 30 days after the Project completion. The NOC shall demonstrate that the Project has been carried out in accordance with the Project description in the Certification and in any approved amendments. The NOC shall include a map of the Project location(s), including final boundaries of any on-site restoration area(s), if appropriate, and representative pre and post construction photographs. Each photograph shall include a descriptive title, date taken, photographic site, and photographic orientation.
3. All reports, notices, or other documents required by this Certification or requested by the Central Valley Water Board shall be signed by a person described below or by a duly authorized representative of that person.
  - a. For a corporation: by a responsible corporate officer such as (1) a president, secretary, treasurer, or vice president of the corporation in charge of a principal business function; (2) any other person who performs similar policy or decision-making functions for the corporation; or (3) the manager of one or more manufacturing, production, or operating facilities if *authority* to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
  - b. For a partnership or sole proprietorship: by a general partner or the proprietor.
  - c. For a municipality, State, federal, or other public agency: by either a principal executive officer or ranking elected official.
4. Any person signing a document under General Condition No. 3 shall make the following certification, whether written or implied:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

## ADDITIONAL TECHNICALLY CONDITIONED CERTIFICATION CONDITIONS:

In addition to the standard and general conditions above, the Applicant shall satisfy the following:

1. The Applicant shall notify the Central Valley Water Board in writing **seven days** prior to beginning any in-water activities.
2. Except for activities permitted by the U.S. Army Corps of Engineers under § 404 of the Clean Water Act, soil, silt, or other organic materials shall not be placed where such materials could pass into surface water or surface water drainage courses.
3. All areas disturbed by Project activities shall be protected from washout or erosion.

4. The Applicant shall maintain a copy of this Certification and supporting documentation (Project Information Sheet) at the Project site during construction for review by site personnel and agencies. All personnel (employees, contractors, and subcontractors) performing work on the proposed Project shall be adequately informed and trained regarding the conditions of this Certification.
5. An effective combination of erosion and sediment control Best Management Practices (BMPs) shall be implemented and adequately working during all phases of construction.
6. All temporarily affected areas shall be restored to pre-construction contours and conditions upon completion of construction activities.
7. The Applicant shall perform surface water sampling: 1) when performing any in-water work; 2) in the event that Project activities result in any materials reaching surface waters or; 3) when any activities result in the creation of a visible plume in surface waters. Pollutants shall be analyzed using the analytical methods described in 40 Code of Federal Regulations Part 136; where no methods are specified for a given pollutant, the method shall be approved by Central Valley Water Board staff. The following monitoring shall be conducted immediately upstream out of the influence of the Project and approximately 300 feet downstream of the active work area. Sampling results shall be submitted to this office by the first day of the second month following sampling. The sampling frequency and monitoring locations may be modified for certain projects with written permission from the Central Valley Water Board Executive Officer.

Parameter	Unit	Type of Sample	Frequency of Sample
Turbidity	NTU	Grab	Every 4 hours during in-water work
Settleable Material	ml/L	Grab	Same as above
pH	Standard units	Grab	Daily during concrete activity
Visible construction related pollutants	Observation	Visible Inspections	Continuous throughout the construction period

8. Activities shall not cause in surface waters:
  - (a) where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases exceeding 1 NTU;
  - (b) where natural turbidity is between 5 and 50 NTUs, increases exceeding 20 percent;
  - (c) where natural turbidity is between 50 and 100 NTUs, increases exceeding 10 NTUs;
  - (d) where natural turbidity is greater than 100 NTUs, increases exceeding 10 percent.

In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected. Averaging periods may only be used with prior permission of the Central Valley Water Board Executive Officer.

9. Activities shall not cause settleable material to exceed 0.1 ml/L in surface waters as measured in surface waters downstream from the Project.

10. Activities shall not cause the pH in surface waters to be depressed below 6.5 nor raised above 8.3.
11. The discharge of petroleum products or other excavated materials to surface water is prohibited. Activities shall not cause visible oil, grease, or foam in the work area or downstream. The Applicant shall notify the Central Valley Water Board immediately of any spill of petroleum products or other organic or earthen materials.
12. Prior to arrival at the project site and prior to leaving the project site, construction equipment that may contain invasive plants and/or seeds shall be cleaned to reduce the spreading of noxious weeds.
13. The Applicant shall implement the Wetlands Mitigation and Monitoring Plan (WMMP), as approved by the Central Valley Water Board on 31 July 2015. Modification to the WMMP must be submitted to the Central Valley Water Board for approval by the Executive Officer.
14. The Applicant shall notify the Central Valley Water Board immediately if any of the above conditions are violated, along with a description of measures it is taking to remedy the violation.
15. The Applicant shall comply with all California Department of Fish and Game Code § 1600 requirements for the Project.
16. The Applicant must obtain coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction Activities issued by the State Water Resources Control Board for any project disturbing an area of one acre or greater.
17. In the event of any violation or threatened violation of the conditions of this Certification, the violation or threatened violation shall be subject to any remedies, penalties, process, or sanctions as provided for under State law and § 401 (d) of the federal Clean Water Act. The applicability of any State law authorizing remedies, penalties, process, or sanctions for the violation or threatened violation constitutes a limitation necessary to ensure compliance with this Certification.
18. If the Applicant or a duly authorized representative of the Applicant fails or refuses to furnish technical or monitoring reports, as required under this Certification, or falsifies any information provided in the monitoring reports, the Applicant will be subject to civil liability, for each day of violation, or criminal liability.
19. In response to a suspected violation of any condition of this Certification, the Central Valley Water Board may require the Applicant to furnish, under penalty of perjury, any technical or monitoring reports the Central Valley Water Board deems appropriate, provided that the burden, including cost of the reports, shall be in reasonable relationship to the need for the reports and the benefits to be obtained from them.
20. The Applicant shall allow staff of the Central Valley Water Board, or an authorized representative(s), upon the presentation of credentials and other documents, as may be required by law, to enter the Project premises for inspection, including taking photographs and securing copies of project-related records, for the purpose of assuring compliance with this Certification and determining the ecological success of the Project.

**CENTRAL VALLEY WATER BOARD CONTACT PERSON:**

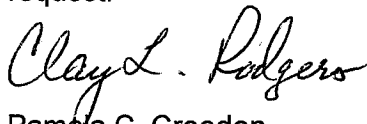
Debra Mahnke, Water Resource Control Engineer  
1685 E Street  
Fresno, CA 93706  
(559) 445-6281  
debra.mahnke@waterboards.ca.gov

**WATER QUALITY CERTIFICATION:**

I hereby issue an order certifying that the proposed discharge from the Panoche Valley Solar, LLC Panoche Valley Solar Facility Project, WDID 5C35CR00002, will comply with the applicable provisions of § 301 ("Effluent Limitations"), § 302 ("Water Quality Related Effluent Limitations"), § 303 ("Water Quality Standards and Implementation Plans"), § 306 ("National Standards of Performance"), and § 307 ("Toxic and Pretreatment Effluent Standards") of the Clean Water Act. This discharge is also regulated under State Water Resources Control Board Water Quality Order No. 2003-0017 DWQ "Statewide General Waste Discharge Requirements For Dredged Or Fill Discharges That Have Received State Water Quality Certification."

Except insofar as may be modified by any preceding conditions, all certification actions are contingent on (a) the discharge being limited to and all proposed mitigation being completed in strict compliance with the Applicant's project description, the attached "Project Information Sheet," and the Applicant's water quality certification application; and (b) compliance with all applicable requirements of the Central Valley Water Board's *Water Quality Control Plan for the Tulare Lake Basin*, Second Edition, revised January 2004.

Any person aggrieved by this action may petition the State Water Resources Control Board to review the action in accordance with California Water Code § 13320 and California Code of Regulations, title 23, § 2050 and following. The State Water Resources Control Board must receive the petition by 5:00 p.m., 30 days after the date of this action, except that if the thirtieth day following the date of this action falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Resources Control Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: [http://www.waterboards.ca.gov/public\\_notices/petitions/water\\_quality](http://www.waterboards.ca.gov/public_notices/petitions/water_quality) or will be provided upon request.



for Pamela C. Creedon  
Executive Officer

Enclosure: Water Quality Order No. 2003-0017 DWQ  
Attachment: Project Information Sheet

## Central Valley Regional Water Quality Control Board

15 October 2015

TO: See attached addressee list

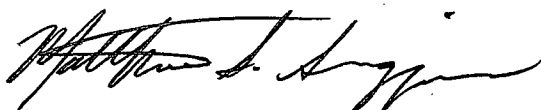
### **CLEAN WATER ACT §401 TECHNICALLY CONDITIONED WATER QUALITY CERTIFICATION AND RESPONSES TO COMMENTS FOR DISCHARGE OF DREDGED AND/OR FILL MATERIALS FOR THE PANOCHE VALLEY SOLAR FACILITY PROJECT, WDID#5C35CR00002, SAN BENITO COUNTY**

Enclosed is a copy of the Order issued by the Executive Officer of the Central Valley Regional Water Quality Control Board, serving as certification of the Panoche Valley Solar Project permitted by the United States Army Corps of Engineers' Individual Permit under § 401 of the Clean Water Act and a Waste Discharge Requirement under the Porter-Cologne Water Quality Control Act and State Water Resources Control Board Order 2003-0017-DWQ, responding to the 4 November 2014 application and the 30 January 2015 revised application submitted by Panoche Valley Solar, LLC (Applicant).

Also enclosed are responses to comments submitted by Fresno Audubon Society, Santa Clara Valley Audubon Society, Ohlone Audubon Society, Citizens to Complete the Refuge, Defenders of Wildlife, Sierra Club, and Center for Biological Diversity (Environmental Groups), and by Kim Williams on the Clean Water Act section 401 Water Quality Certification (Certification) application. The comments were submitted in response to the public notice posted on the Central Valley Water Board website on 20 February 2015 regarding the Certification application.

To conserve resources, paper copies of the Order and responses to comments are being sent to the Applicant, the Environmental Groups, and Ms. Williams. The Order, comments received, and responses to comments are available electronically on our California Integrated Water Quality System (CIWQS) database (<https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?inCommand=drilldown&reportName=facilityAtAGlance&placeID=815414&reportID=1794935>).

If you have any questions or would like to receive paper copies, please contact Debra Mahnke at (559) 445-6281 or [debra.mahnke@waterboards.ca.gov](mailto:debra.mahnke@waterboards.ca.gov).



MATTHEW S. SCROGGINS  
Senior Engineer  
RCE No. 67491

Enclosures: Clean Water Act section 401 Certification (Applicant, Environmental Groups, and Kim Williams only)  
Responses to Comments (Applicant, Environmental Groups, and Kim Williams only)

## APPLICANT

Eric Cherniss  
Panoche Valley Solar, LLC  
845 Oak Grove Ave., Suite 202  
Menlo Park, CA 94025

## INTERESTED PERSONS LIST

Jason Brush, Supervisor, Wetlands Regulatory Office, U.S. Environmental Protection Agency, Region 9, San Francisco (email)  
Kate Dadey, Sacramento South Branch Chief, Regulatory Unit, Department of the Army, Corps of Engineers, Sacramento  
Bill Orme, Water Quality Certification Unit Chief, Division of Water Quality, State Water Resources Control Board, Sacramento (email)  
Regional Manager, San Joaquin Valley-Southern Sierra Region, California Department of Fish and Wildlife, Fresno  
Margie Barrios, Supervisor, County of San Benito, 481 4th St., 1st Floor, Hollister, 95023  
San Benito County Department of Public Works and Planning  
Fresno County Department of Public Works and Planning  
Kim Williams, 32615 Panoche Road, Panoche Valley, CA 95043 (Order and Response to Comments only)  
Robert Snow, Fresno Audubon Society, P.O. Box 9324, Fresno, 93791 (Order and Response to Comments only)  
Shani Kleinhaus, Santa Clara Audubon Society, 22221 McClellan Rd., Cupertino, 94303 (Order and Response to Comments only)  
Carin High, Citizens Committee to Complete the Refuge, 453 Tennessee Lane, Palo Alto, 94306 (Order and Response to Comments only)  
Kim Delfino, Defenders of Wildlife, 1303 J Street, Ste 270, Sacramento, 95814 (Order and Response to Comments only)  
Michare Ferreira, Sierra Club, Loma Prieta Chapter, 3921 E. Bayshore Rd., Ste. 204, Palo Alto, 94303 (Order and Response to Comments only)  
Sarah K. Friedman, Sierra Club, Los Angeles Chapter, 3435 Wilshire Blvd, Ste.660, Los Angeles, 90010-1904 (Order and Response to Comments only)  
Ileene Anderson, Center for Biological Diversity, 8033 Sunset Blvd., #447, Los Angeles, CA 90046 (Order and Response to Comments only)  
Evelyn Cormier, Ohlone Audubon Society, 1922 Hillsdale Street, Hayward, CA 94541 (Order and Response to Comments only)  
Cody Elliot, San Benito Residents for Responsible Development, Adams Broadwell Joseph & Cardozo, 601 Gateway Boulevard, Ste. 1000, South San Francisco, 94080-7037  
Elizabeth D. Kipp, Big Sandy Rancheria, P.O. Box 337, Auberry, 93602  
Jeffrey Lee, Cold Springs Rancheria of Mono Indians, P.O. Box 209, Tollhouse, 93667  
Rueben Barrios Sr., Santa Rosa Rancheria Tachi Yokut Tribe, P.O. Box 8, Lemoore, 93245  
Leanne Walker-Grant, Table Mountain Rancheria, P.O. Box 410, Friant, 93626  
Benjamin Charley, Sr., Dunlap Band of Mono Indians, Box 45, Dunlap, 93621  
Robert Ledger, Dumna Wo-Wah Tribal Government, 2216 E. Hammond St., Fresno, 93703  
Kenneth Woodrow, Wuksache Indian Tribe/Eshorn Valley Band, 1179 Rock Haven Ct., Salinas 93906  
David Alvarez, Traditional Choinumni Tribe, 2415 E. Houston Ave., Fresno, 93720  
Ann Marie Sayers, Indian Canyon Mutsun Band of Costanoan, P.O. Box 28, Hollister, 95024  
Louise Miranda-Ramirez, Ohlone/Costanoan-Esselen Nation, P.O. Box 1301, Monterey, 93942  
John W. Burch, Salinan Tribe of Monterey, San Luis Obispo and San Benito Counties, 7070 Morro Road, Ste. A, Atascadero, 93422  
Ramona Garibay Representative, Trina Marine Ruano Family, 30940 Watkins St., Union City, 94587  
Donna Harro, Xolon Salinan Tribe, 150 Fig Tree Lane, Apt. 28, Martinez, 94553

## PROJECT INFORMATION SHEET

**Application Date:** 4 November 2014, revised on 30 January 2015

**Applicant:** Panoche Valley Solar, LLC

**Applicant Representatives:** Eric Cherniss, Lead Developer  
Jennifer Kaminsky, Burns and McDonnell

**Project Name:** Panoche Valley Solar Facility Project

**Application Number:** WDID 5C35CR00002

**Type of Project:** Solar photovoltaic energy generating facility

**Project Location:** 2 miles north of the intersection of Little Panoche Road and Panoche Road, Sections 3-4, 8-11, 13-16, Township 15 South, Range 10 East, MDB&M.

**Project Duration:** The Project is tentatively scheduled to begin in 2015 and be completed in eighteen months. The schedule may be adjusted to avoid or minimize environmental impacts.

**County:** San Benito

**Receiving Water:** Las Aguilas Creek, Panoche Creek, and three unnamed ephemeral drainages, Tulare Lake Hydrologic Basin, Coast Range Hydrologic Unit #559.11, Ciervo Hills HA, Panoche HSA

**Water Body Type:** Un-vegetated streambed

**Designated Beneficial Uses:** The *Water Quality Control Plan for the Tulare Lake Basin*, Second Edition, revised January 2004 (Basin Plan), has designated beneficial uses for surface and ground waters within the region. Beneficial uses that could be impacted by the project include, but are not limited to: Municipal and Domestic Water Supply (MUN); Agricultural Supply (AGR); Industrial Supply (IND); Hydropower Generation (POW); Groundwater Recharge (GWR); Water Contact Recreation (REC-1); Non-Contact Water Recreation (REC-2); Warm Freshwater Habitat (WARM); Cold Freshwater Habitat (COLD); Preservation of Biological Habitats of Special Significance (BIOL); Rare, Threatened, or Endangered Species (RARE); Migration of Aquatic Organisms (MIGR); Spawning, Reproduction, and/or Early Development (SPWN); and Wildlife Habitat (WILD). A comprehensive and specific list of the beneficial uses applicable for the project area can be found at [http://www.waterboards.ca.gov/centralvalley/water\\_issues/basin\\_plans/index.shtml](http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/index.shtml).

**Project Description:** The Project consists of the construction and operation of a 247 megawatt (AC) solar photovoltaic energy generating facility. The Proposed Project Footprint consists of approximately 2,506 acres located in the Panoche Valley of eastern San Benito County, California. The Project Footprint will be comprised of the following components: solar arrays, an operations and maintenance building, project perimeter roads including emergency access and egress, collection lines, electrical transformers, DC-AC inverters, and an electrical substation and switchyard. In connection with the Proposed Project, Pacific Gas & Electric will also be performing telecommunication upgrades. The impacts to the jurisdictional waters (federal waters) would result from the mandatory emergency road crossings over Las Aguilas Creek channel as well as three additional crossings of un-vegetated streambeds.

**Preliminary Water Quality Concerns:** Construction activities may impact surface waters with increased turbidity and settleable matter.

**Proposed Mitigation to Address Concerns:** The Applicant has placed heavy emphasis on Low Impact Development (LID) criteria when designing the Project as per the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activities. The Project is not expected to significantly alter the pre-development hydrologic conditions within the Project Footprint. The Project has been designed to implement the following LID features and criteria:

- Hardscape and impermeable surfaces will be minimal;
- PV modules will be elevated above grade, which preserves permeability of the soil within the Project Site;
- Existing natural drainage flows will be maintained as much as possible;
- A Wetland Mitigation and Monitoring Plan and a Habitat Management Plan will be developed for the Project to mitigate potential impacts;
- Road crossings will be avoided where possible, and where necessary, roads will be built as near to right angles to the streams and drainages as possible;
- All construction and maintenance activities shall be conducted in a manner that would minimize disturbance to vegetation, drainage channels, and intermittent or perennial stream banks for both federal and non-federal waters;
- A Fugitive Dust Mitigation Plan will be developed for the Project, which will include dust-control measures in sensitive areas; and
- Low water crossings (LWC) will be used within the Project Footprint where feasible.

**Fill/Excavation Area:**

**Table 1. Proposed Impacts to Federal Waters from Project Construction**

Drainage Impact #	Latitude/Longitude	Type of Crossings	Approx. Cut/Fill (Yd3)	Approx. Total Linear Ft.	Approx. Total acre(s)
1	N036° 38' 13.08"/ W120° 53' 56.96"	Singe span bridge	343/396	*20	0.001
14	N036° 38' 55.47"/ W120° 51' 54.94"	Perimeter Rd	103/4,865	1,529	0.05
19	N036° 38' 31.05"/ W120° 51' 41.12"	Perimeter Rd	204/1,008	1,156	0.04
22	N036° 38' 05.31"/ W120° 51' 13.69"	Perimeter Rd	13/611	799	0.03
<b>TOTAL</b>				<b>3,504</b>	<b>0.121</b>

\*Impacts will be due to rip rap support for the bridge abutments.

**Table 2. Proposed Impacts to Federal Waters from Compensatory Mitigation (Debris Removal)**

Drainage Impact #	Latitude/Longitude			Total Linear Ft.	Total acre(s)
Debris Removal Area 1b	N36°38'54.98"/W120°49'43.47"			30	0.003
Debris Removal 4	N36°35'7.57"/ W120°47'12.04"			323	0.093
<b>TOTAL</b>				<b>353</b>	<b>0.096</b>

**Dredge Volume:** None

**U.S. Army Corps of Engineers Permit Number:** Individual Permit

**Department of Fish and Wildlife Streambed Alteration Agreement:** The Applicant originally applied for a Streambed Alteration Agreement on 13 October 2014, and submitted revised applications on 21 March 2014 and 18 August 2015.

**Status of CEQA Compliance:** The County of San Benito, acting as the California Environmental Quality Act (CEQA, Public Resources Code § 21000, et seq.) Lead Agency, certified the Final Environmental Impact Report (FEIR) on 10 November 2010. A Notice of Determination was filed with the State Clearinghouse on 22 November 2010. Subsequently, on 19 May 2015, the County of San Benito certified a Supplemental EIR (SEIR) to reflect changes to the previously certified project. A Notice of Determination was filed with the County of San Benito on 20 May 2015, with Fresno County on 22 May 2015, and the State Clearinghouse on 11 June 2015.

Following certification of the SEIR, the County of San Benito adopted a Statement of Overriding Considerations for significant impacts considered unavoidable and not reduced to a level of Less Than Significant by mitigation. The unavoidable significant impacts not expected to be reduced by mitigation listed in the SEIR were related to aesthetics and construction noise.

The SEIR concludes that the Project is not expected to cause or contribute to any violation of applicable water quality standards or substantially degrade existing water quality, and that the implementation of specific mitigation measures will further reduce potential impacts to water quality to a less than significant level.

The Central Valley Water Board, acting as a CEQA Responsible Agency in compliance with California Code of Regulations (CCR), title 14 § 15096, reviewed both the Notice of Preparation of the FEIR and SEIR, and the FEIR and SEIR for the Project, and submitted comments to the County of San Benito accordingly. The Central Valley Water Board also evaluated the potentially significant impacts resulting from the fill of drainages and related mitigation measures identified in the FEIR and SEIR. Mitigation measures were imposed on the Project in the FEIR and SEIR to ensure that impacts resulting from the fill of drainages are less than significant.

**Compensatory Mitigation:** On 15 June 2015, the Discharger submitted a document entitled draft Wetlands Mitigation and Monitoring Plan (Mitigation Plan). The Mitigation Plan proposes to mitigate for impacts to both the waters of the United States and waters of the State through the creation, enhancement, and restoration of water features on designated Conservation Lands described below. As described in the Mitigation Plan and below, the Discharger will provide for the direct creation, enhancement, or restoration of 11.960 acres of drainages, vernal pools, and wetlands by implementing the Mitigation Plan.

Additionally, to mitigate for the loss of waters of the State and the United States, the Discharger will preserve a total of 24,176 acres, which will be managed through implementation of a Conservation Management Plan. Preserved lands include the Valley Floor Conservation Lands (2,514 acres), Valadeao Ranch Conservation Lands (10,772 acres), and Silver Creek Ranch Conservation Lands (10,890 acres). The three large parcels of Conservation Lands are contiguous with the Project site and with 86,000 acres of Bureau of Land Management lands. The Discharger will preserve in perpetuity under conservation easement 716,853 linear feet of streams, drainages, and creeks within the Conservation Lands, as shown in Table 3 below.

**Table 3. Summary of Preserved Waters of the State**

<b>Total Linear Feet of Streams, Drainages, &amp; Creeks</b>	
Valley Floor Conservation Lands	81,957
Valadeao Ranch Conservation Lands	326,519
Silver Creek Ranch Conservation Lands	308,377
<b>Total Linear Feet</b>	<b>716,853</b>

The Conservation Lands associated with the Project are located within Township 15S, Range 10E, Sections 3-4, 8-10, 13-16, and 25; Township 15S, Range 11E, Section 19; Township 14S, Range 10E, Sections 21-27 and 32-36; Township 14S, Range 11E, Sections 19 and 29-32; Township 15S, Range 10E, Sections 1-8 and 10-14; Section 15S, Township 11E, Sections 6-7, 19-20, and 26-36; and Township 16S, Range 11E, Sections 1-6 and 8-12. The solar facility and all associated land will be located on property under control of the Discharger.

The Discharger will create three ponds to support California tiger salamander (CTS) viability on the Valadeao Ranch Conservation Lands northwest of the Project footprint. The total size of the ponds will be approximately 0.31 acres. Additional CTS ponds may be created determined by incidental take of CTS during construction.

The Discharger will install exclusionary fencing around a portion of Panoche Creek channel that has been degraded by overgrazing. The Project will restore 11.16 acres of waters of the State within the Panoche Creek channel, including 5.81 acres considered to be jurisdictional waters of the United States.

The Discharger will enhance approximately 0.050 acres of existing ephemeral pools on the Valley Floor Conservation Lands that have been degraded by overgrazing by seeding the pools with approved native seed mixes or inoculum from vernal pools within the Project footprint that will be impacted.

The Discharger will restore approximately 0.44 acres of stream channels in seven locations by removing debris and reseeding the channels.

The Mitigation Plan describes detailed activities and plans, performance criteria to measure success, initial monitoring and management actions, and long-term management activities to mitigate for unavoidable impacts to State and Federal waters resulting from construction of the Project. This Certification requires the Discharger to proceed with the proposed Mitigation Plan and requires monitoring and adaptive management measures to ensure successful implementation.

**Application Fee Provided:** Total fees of \$90,600 have been submitted as required by 23 CCR §3833(b)(3)(A) and by 23 CCR §2200(e) for impacts to waters of the United States and waters of the State.

## **STATE WATER RESOURCES CONTROL BOARD**

### **WATER QUALITY ORDER NO. 2003 - 0017 - DWQ**

#### **STATEWIDE GENERAL WASTE DISCHARGE REQUIREMENTS FOR DREDGED OR FILL DISCHARGES THAT HAVE RECEIVED STATE WATER QUALITY CERTIFICATION (GENERAL WDRs)**

The State Water Resources Control Board (SWRCB) finds that:

1. Discharges eligible for coverage under these General WDRs are discharges of dredged or fill material that have received State Water Quality Certification (Certification) pursuant to federal Clean Water Act (CWA) section 401.
2. Discharges of dredged or fill material are commonly associated with port development, stream channelization, utility crossing land development, transportation water resource, and flood control projects. Other activities, such as land clearing, may also involve discharges of dredged or fill materials (e.g., soil) into waters of the United States.
3. CWA section 404 establishes a permit program under which the U.S. Army Corps of Engineers (ACOE) regulates the discharge of dredged or fill material into waters of the United States.
4. CWA section 401 requires every applicant for a federal permit or license for an activity that may result in a discharge of pollutants to a water of the United States (including permits under section 404) to obtain Certification that the proposed activity will comply with State water quality standards. In California, Certifications are issued by the Regional Water Quality Control Boards (RWQCB) or for multi-Region discharges, the SWRCB, in accordance with the requirements of California Code of Regulations (CCR) section 3830 et seq. The SWRCB's water quality regulations do not authorize the SWRCB or RWQCBs to waive certification, and therefore, these General WDRs do not apply to any discharge authorized by federal license or permit that was issued based on a determination by the issuing agency that certification has been waived. Certifications are issued by the RWQCB or SWRCB before the ACOE may issue CWA section 404 permits. Any conditions set forth in a Certification become conditions of the federal permit or license if and when it is ultimately issued.
5. Article 4, of Chapter 4 of Division 7 of the California Water Code (CWC), commencing with section 13260(a), requires that any person discharging or proposing to discharge waste, other than to a community sewer system, that could affect the quality of the waters of the State,<sup>1</sup> file a report of waste discharge (ROWD). Pursuant to Article 4, the RWQCBs are required to prescribe waste discharge requirements (WDRs) for any proposed or existing discharge unless WDRs are waived pursuant to CWC section 13269. These General WDRs fulfill the requirements of Article 4 for proposed dredge or fill discharges to waters of the United States that are regulated under the State's CWA section 401 authority.

---

<sup>1</sup> "Waters of the State" as defined in CWC Section 13050(e)

6. These General WDRs require compliance with all conditions of Certification orders to ensure that water quality standards are met.
7. The U.S. Supreme Court decision of *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, 531 U.S. 159 (2001) (the *SWANCC* decision) called into question the extent to which certain "isolated" waters are subject to federal jurisdiction. The SWRCB believes that a Certification is a valid and enforceable order of the SWRCB or RWQCBs irrespective of whether the water body in question is subsequently determined not to be federally jurisdictional. Nonetheless, it is the intent of the SWRCB that all Certification conditions be incorporated into these General WDRs and enforceable hereunder even if the federal permit is subsequently deemed invalid because the water is not deemed subject to federal jurisdiction.
8. The beneficial uses for the waters of the State include, but are not limited to, domestic and municipal supply, agricultural and industrial supply, power generation, recreation, aesthetic enjoyment, navigation, and preservation and enhancement of fish, wildlife, and other aquatic resources.
9. Projects covered by these General WDRs shall be assessed a fee pursuant to Title 23, CCR section 3833.
10. These General WDRs are exempt from the California Environmental Quality Act (CEQA) because (a) they are not a "project" within the meaning of CEQA, since a "project" results in a direct or indirect physical change in the environment (Title 14, CCR section 15378); and (b) the term "project" does not mean each separate governmental approval (Title 14, CCR section 15378(c)). These WDRs do not authorize any specific project. They recognize that dredge and fill discharges that need a federal license or permit must be regulated under CWA section 401 Certification, pursuant to CWA section 401 and Title 23, CCR section 3855, et seq. Certification and issuance of waste discharge requirements are overlapping regulatory processes, which are both administered by the SWRCB and RWQCBs. Each project subject to Certification requires independent compliance with CEQA and is regulated through the Certification process in the context of its specific characteristics. Any effects on the environment will therefore be as a result of the certification process, not from these General WDRs. (Title 14, CCR section 15061(b)(3)).
11. Potential dischargers and other known interested parties have been notified of the intent to adopt these General WDRs by public hearing notice.
12. All comments pertaining to the proposed discharges have been heard and considered at the November 4, 2003 SWRCB Workshop Session.
13. The RWQCBs retain discretion to impose individual or General WDRs or waivers of WDRs in lieu of these General WDRs whenever they deem it appropriate. Furthermore, these General WDRs are not intended to supersede any existing WDRs or waivers of WDRs issued by a RWQCB.

IT IS HEREBY ORDERED that WDRs are issued to all persons proposing to discharge dredged or fill material to waters of the United States where such discharge is also subject to the water quality certification requirements of CWA section 401 of the federal Clean Water Act (Title 33 United States Code section 1341), and such certification has been issued by the applicable RWQCB or the SWRCB, unless the applicable RWQCB notifies the applicant that its discharge will be regulated through WDRs or waivers of WDRs issued by the RWQCB. In order to meet the provisions contained in Division 7 of CWC and regulations adopted thereunder, dischargers shall comply with the following:

1. Dischargers shall implement all the terms and conditions of the applicable CWA section 401 Certification issued for the discharge. This provision shall apply irrespective of whether the federal license or permit for which the Certification was obtained is subsequently deemed invalid because the water body subject to the discharge has been deemed outside of federal jurisdiction.
2. Dischargers are prohibited from discharging dredged or fill material to waters of the United States without first obtaining Certification from the applicable RWQCB or SWRCB.

#### CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Resources Control Board held on November 19, 2003.

AYE:        Arthur G. Baggett, Jr.  
             Peter S. Silva  
             Richard Katz  
             Gary M. Carlton  
             Nancy H. Sutley

NO:         None.

ABSENT:    None.

ABSTAIN:   None.

  
Debbie Irvin  
Clerk to the Board

## Central Valley Regional Water Quality Control Board

### Responses to Written Comments for the

### PANOCH VALLEY SOLAR, LLC PANOCH VALLEY SOLAR PROJECT SAN BENITO COUNTY

### Clean Water Act section 401 Water Quality Certification

---

The following are Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff responses to written comments received regarding the application for a Clean Water Act section 401 Water Quality Certification (401 Certification) for the Panoche Valley Solar, LLC (hereinafter referred to as Discharger), Panoche Valley Solar Project (Project).

According to Title 23, California Code of Regulations §3858, the executive director or the executive officer with whom an application for certification is filed shall provide public notice of an application at least twenty-one (21) days before taking certification action on the application, unless the public notice requirement has been adequately satisfied by the applicant or federal agency. On 20 February 2015, public notice regarding the 401 Certification application was posted on the Central Valley Water Board website. Written comments on the 401 Certification application were received from:

- Joint comments from Fresno Audubon Society, Santa Clara Valley Audubon Society, Ohlone Audubon Society, Citizens to Complete the Refuge, Defenders of Wildlife, Sierra Club, and Center for Biological Diversity (Environmental Groups) (13 March 2015)
- Kim Williams, Panoche Valley resident (13 March 2015)

Written comments are below, followed by the responses of Central Valley Water Board staff.

---

#### ENVIRONMENTAL GROUPS COMMENTS

---

##### Environmental Groups Comment 1:

*"The project involves the construction of a 247 Megawatt solar photovoltaic energy generating facility on approximately 2,506 acres. The project will result in impacts to 5 waters of the United States in addition to thirty-two waters of the State. Based upon our review of the information provided, we urge the Central Valley Regional Water Quality Control Board (CVRWQCB) to suspend the public notice process. Failing suspension of the permit application review, the CVRWQCB has no recourse but to deny the permit application without prejudice as the California Environmental Quality Act (CEQA) Supplemental Environmental Impact Report (SEIR) has not yet been finalized, and the U.S. Army Corps of Engineers (Corps) Environmental Impact Statement (EIS) has not yet been released.*

*The "Instructions for Completing the Clean Water Act Section 401 Water Quality Certification Application" advise: If another local or State agency is the lead agency for CEQA, obtain the final environmental documentation and determination before the certification application is submitted. If the Regional (or State) Board must be the CEQA Lead Agency, contact that agency well before submitting the application." [Emphasis is as in the original instructions]*

*Clearly there is a strong preference that the CEQA environmental review process be completed prior to the submittal of any application for water quality certification, and with good reason. The purpose of the CEQA process is to identify and analyze all potential significant impacts to the environment, and provide mitigation measures to reduce significant adverse impacts to levels that are less than significant. Should the environmental review document fail to do so, resource and regulatory agencies and members of the public have the opportunity to inform the review process through the public comment process. As stated above, the SEIR for the revised Panoche Solar Facility has not yet been finalized. Neither the CVRWQCB, nor the public have had the opportunity to review the comments submitted, or the responses to the comments provided by the lead agency. Thus, it is impossible at this time to know whether substantive issues have been identified that could result in additional impacts to waters of the United States and waters of the State."*

**RESPONSE:** The commenter states that there is a "strong preference" that the California Environmental Quality Act (CEQA) environmental review process is completed prior to the submittal of an application for a 401 Certification, but there is no legal requirement to do so. Additionally, the *"Instructions for Completing the Clean Water Act Section 401 Water Quality Certification Application"* referred to in the comments are not from the Central Valley Water Board website. The Central Valley Water Board's website states, in accordance with Title 23, California Code of Regulations (CCR), Section 3856, that applicants should provide a *"copy of any draft or final CEQA document(s), if available, prepared for the activity. Although CEQA documentation is not required for a complete application, the certifying agency shall be provided with and have ample time to properly review a final copy of valid CEQA documentation before taking a certification action."*

The Central Valley Water Board must comply with CEQA, and relied on the certification of the Final SEIR before issuing the 401 Certification. The San Benito County Planning Commission certified the Final SEIR on 25 April 2015. Furthermore, the Draft SEIR had previously been released on December 23, 2014 and was available for public review for more than 45 days, ending on February 10, 2015 and all interested parties and stakeholders, including the Central Valley Water Board had the opportunity to review the Draft SEIR and prepare comments.

## **Environmental Groups Comment 2:**

*"Similarly, an Environmental Impact Statement (EIS) is the National Environmental Policy Act (NEPA) disclosure document that is meant to identify and analyze all known impacts to the environment, including aquatic resources. Like CEQA review, an EIS must consider more than just the significant impacts to waters of the United States, including, but not limited to, geologic, hazardous materials, public safety, cumulative impacts, irretrievable commitment of resources, etc. It is entirely possible that mitigations proposed to address significant impacts to one resource (aesthetic, cultural, biological, geological, hydrological, public safety, etc.) could result in an alteration of the project design, and could result in greater impacts to Waters of the State. The Corps issued a Notice of Intent to prepare a Draft EIS July 19, 2012. It is our understanding that the Corps is still several months away from releasing the DEIS. Why would*

*the CVRWQCB issue its water quality certification in advance of the Corps' Record of Decision? Just as with the CEQA process, mitigation measures to address impacts to endangered species, public safety, geological and soil issues, etc., may result in additional changes to the proposed project. It is premature for the CVRWQCB to consider issuance of water quality certification for the proposed project until the NEPA and CEQA processes have concluded.*

*Initiation of the public notice process at this time, prior to the conclusion of the CEQA and NEPA review processes, is thwarting the public's ability to provide substantive comments regarding protection of waters of the State. Nor does it allow the CVRWQCB to review the finalized project."*

**RESPONSE:** The Central Valley Water Board is not required to review or comply with NEPA documents before issuing a 401 Certification, but rather is required to comply with CEQA as set forth in CCR Title 23. The central feature of the Clean Water Act Section 401 is the ability given to the states to grant, grant with conditions, deny, or waive the Certification that a Project will comply with state water quality standards. A federal agency cannot issue a Section 404 permit until the state has granted the 401 Certification, and state 401 Certification conditions become the conditions of the federal permit. The 401 Certification that the Central Valley Water Board issued includes conditions to protect water quality during construction and operation of the Project.

Additionally, the 401 Certification addresses only water quality impacts to waters of the United States on the Project site, which include 0.122 acres of ephemeral streams. On 24 June 2015, the Army Corps of Engineers (Corps) approved a Preliminary Jurisdictional Determination concurring with the amount and locations of the water bodies identified on the Project site. The Project impacts to waters of the United States, primarily due to installation of low water crossings and installation of riprap for scour protection, appear to be insignificant. In addition, the impacts to waters of the United States will be adequately mitigated. If the Project design is modified based on the EIS to increase water quality impacts to waters of the United States, the 401 Certification will be amended.

### **Environmental Groups Comment 3:**

*Comment: "Errata Sheet #2 to the Final EIR (2010) acknowledged that in accordance with the Basin Plan, all natural surface waters in the project area, including intermittent or ephemeral drainages, are considered "westside streams" and as designated in Table II-1 of the Basin Plan, are managed for the following Beneficial Uses:*

- *Agricultural supply*
- *Industrial Service and Process Supply*
- *Water Contact Recreation*
- *Non-Water Contact Recreation*
- *Warm Freshwater Habitat*

- *Wildlife Habitat*
- *Rare, Threatened or Endangered Species Habitat*
- *Groundwater Recharge*

*In response to an email from the Central Valley Regional Water Quality Control Board (see attached), an Errata Sheet was introduced as a last-minute revision at the San Benito Board of Supervisor's meeting on the same night that the FEIR for Project was approved. The Final EIR was written based on the erroneous assumption that Panoche Valley streams, washes and surface flow had no identified beneficial uses. This error meant that there was no analysis or mitigation for impacts on the streams in the 2010 FEIR. This omission has not been corrected in the DSEIR, which is currently under consideration by San Benito County. Significant impact to beneficial uses can be expected. We attach the following comment letters on the SEIR and ask that you consider all the comments within these letters as comments on the Water Quality Certification Application for the Panoche Solar Facility. We are especially concerned with "take" of rare and endangered species, including the Blunt-nosed Leopard lizard, a fully protected species under California law.*

- *A letter regarding blunt-nosed leopard lizard from the Department of Fish and Wildlife*
- *Comment letter on the Draft Supplemental EIR from the Department of Fish and Wildlife*
- *Comment letter on the Draft Supplemental EIR from the Sierra Club and Santa Clara Valley Audubon Society*
- *Comment letter on the DSEIR from Defenders of Wildlife, the Nature Conservancy, Santa Clara Valley Audubon, Sierra Club, Audubon California and Center for Biological Diversity*

*Based on the information provided in these letters, we expect Project-related activities, including grading, to impact all the "westside streams", vernal pools and surface flows to cause significant and irreversible harm to the following beneficial uses:*

- *Warm Freshwater Habitat*
- *Wildlife Habitat*
- *Rare, Threatened or Endangered Species Habitat*
- *Groundwater Recharge"*

**RESPONSE:** All attached letters referred to by the commenters have been reviewed and acknowledged. The Discharger has prepared a plan entitled Wetlands Mitigation Monitoring Program (WMMP) to meet permit conditions of the Corps, the California Department of Fish and Wildlife (CDFW), and the Central Valley Water Board. Section 3.2 of the WMMP has been revised to address the beneficial uses of the waters on the project site. In accordance with California Water Code §13050, all surface and groundwater resources in the Project area are waters of the State and are subject to designated Beneficial Uses identified in the Tulare Lake Basin Water Quality Control Plan. Surface waters on the project site are designated "westside streams" and have

specific designated Beneficial Uses, per the Water Quality Control Plan for the Tulare Lake Basin as stated by the commenter.

The commenters indicate that significant impact to beneficial uses of surface waters can be expected; however, our review of the letters referenced by the commenters did not identify significant impacts to beneficial uses of surface waters on the project site that would occur due to the Project-related impacts to a cumulative total of 0.122 acres of ephemeral streams that were determined to be waters of the United States and subject to the section 401 Certification. The permitted discharges at seven different impact areas may cause some minor degradation to wetlands and other waters. Due to the minimal size of each area, beneficial use impact is not considered significant. In addition, the filling of these waters will also be mitigated by creation, enhancement, and preservation on Conservation Lands as described in the WMMP and the Final SEIR, further reducing any beneficial use impact.

Impacts to special-status species are be subject to conditions of the Incidental Take Permits from the U.S. Fish and Wildlife Service (USFWS) and CDFW.

#### **Environmental Groups Comment 4:**

*Comment: "The Basin Plan directs the Water Board to protect and enhance both existing and potential Beneficial Uses of Waters of the State. To offset the adverse impacts of the project on waters of the United States and waters of the State, the applicant has provided a Draft Mitigation and Monitoring Plan (MMP). We have only recently (March 10, 2015), received a copy of the MMP. Although we have only had a limited time to review the MMP, we find the MMP fails to adequately mitigate impacts to waters of the United States and State."*

*The MMP states as mitigation for impacts to 0.12 acres (3,504 LF) waters of the United States and to 7.60 acres (16,935 LF) waters of the State, the project proponent will remove and enhance five debris dump sites (0.42 acres) "with seeding of native vegetation and potential erosion control measures if necessary," create a 0.15 acres California tiger salamander (CTS) breeding pond within the Valadeao Ranch Conservation Lands, and partially exclude livestock to restore native vegetation on portions of Panoche Creek totaling 11.16 acres within the Silver Creek Ranch Conservation Lands. Aside from the potential creation of the CTS breeding pond, the MMP focuses on preservation and enhancement of waters of the United States and State and does not ensure there will be no net loss."*

**RESPONSE:** The WMMP mitigation activities include the total preservation of approximately 716,852 linear feet (approximately 136 miles) of stream/creek, ephemeral drainage, and wetland habitat within a total of approximately 24,176 acres in three large parcels of land (Conservation Lands), to be protected in perpetuity, resulting in a preservation to impact ratio of over 33 to 1. The preserved lands have been identified by the USFWS as core recovery habitat areas for threatened and endangered species in the Panoche Valley, including kit fox, giant kangaroo rat, antelope squirrels, and blunt nose leopard lizards.

The proposed mitigation also includes aquatic enhancement, restoration, and creation activities on approximately 12 acres in the Conservation Lands, resulting in an enhancement to impact ratio of 1.4 to 1.

Currently, there is no State policy or regulation specifying the methods for evaluating the achievement of the no net loss standard. Mitigation for impacts to waters of the United States will be required in the CWA section 404 permit that will be issued by the Corps. The Corps must determine mitigation according to federal regulations under 33 CFR Part 332: *Compensatory Mitigation for Losses of Aquatic Resources*.

Under 33 CFR 332, Section 332.3 (h):

- (1) *Preservation may be used to provide compensatory mitigation for activities authorized by [Corps] permits when all the following criteria are met:*
  - (i) *The resources to be preserved provide important physical, chemical, or biological functions for the watershed;*
  - (ii) *The resources to be preserved contribute significantly to the ecological sustainability of the watershed. In determining the contribution of those resources to the ecological sustainability of the watershed, the district engineer must use appropriate quantitative assessment tools, where available;*
  - (iii) *Preservation is determined by the district engineer to be appropriate and practicable;*
  - (iv) *The resources are under threat of destruction or adverse modifications; and*
  - (v) *The Conservation Lands will be permanently protected through an appropriate real estate or other legal instrument (e.g., easement, title transfer to state resource agency or land trust).*
- (2) *Where preservation is used to provide compensatory mitigation, to the extent appropriate and practicable the preservation shall be done in conjunction with aquatic resource restoration, establishment, and/or enhancement activities. This requirement may be waived by the district engineer where preservation has been identified as a high priority using a watershed approach described in paragraph (c) of this section, but compensation ratios shall be higher.*

We believe the mitigation activities proposed for the Project, a combination of preservation and enhancement to increase function, meet the federal mitigation criteria and are adequate to mitigate for the impacts to the 0.122 acres of waters of the United States. However, the mitigation will independently be determined by the Corps in the CWA section 404 permit. The Central Valley Water Board may require additional mitigation if it is warranted.

#### **Environmental Groups Comment 5:**

Comment: *"The CVRWQCB should require the MMP clarify how many linear feet of creeks these actions will enhance."*

**RESPONSE:** Section 6 Table B of the updated WMMP shows that there will be 2,370 linear feet of intermittent and ephemeral streams enhanced.

**Environmental Groups Comment 6:**

Comment: *“The MMP should incorporate monitoring of the creek beds upstream and downstream of the project impact sites to ensure the road crossings, etc., do not result in, or exacerbate, existing bed and bank instability.”*

**RESPONSE:** Appropriate monitoring will be conducted during construction as required by the Storm Water Pollution Prevention Plan that is required under the State Water Resources Control Board National Pollutant Discharge Elimination System General Permit For Storm Water Discharges Associated With Construction And Land Disturbance Activities, Order No. 2009-0009-DWQ (Construction Storm Water Permit). The purpose of the Construction Storm Water Permit is to require implementation of erosion and sediment control measures to ensure the integrity of perimeter roads and the ability of water to flow across the site and discharge into the Panoche and Las Aguilas creeks without causing excessive erosion. Debris dumpsites will be monitored after large rain events for the first 2 years and annually during the wet season during years 3 to 5 to ensure that banks remain stable. Post construction monitoring of all impacted areas of waters of the United States is required by 401 Certification conditions.

**Environmental Groups Comment 7:**

Comment: *“The Draft MMP, contrary to the Errata Sheet mentioned above, states there are no Beneficial Uses for the surface waters occurring within the project site. The MMP should include a discussion of how the proposed mitigation measures will protect or enhance Beneficial Uses.”*

**RESPONSE:** The WMMP has been revised to include an analysis of Beneficial Uses of surface waters within the Project Footprint.

**Environmental Groups Comment 8:**

Comment: *“The MMP states, “Mitigation activities within the Conservation Lands will occur six months to 12 months after completion of the Project.” This is unacceptable. There is no reason the proposed mitigation should not be completed prior to the construction of the proposed project. If the CVRWQCB allows the mitigation to be constructed, after the project is completed, there is little incentive to the project proponent to implement the mitigation plan.”*

**RESPONSE:** The revised WMMP was submitted addressing comments from the Central Valley Water Board staff. Section 7 establishes timelines for all mitigation activities. Any changes and/or updates to the timeline of mitigation activities will be determined by the Corps, Central Valley Water Board, and CDFW. Initial construction of the compensatory mitigation for discharge of fill to waters of the State must be completed within 1 year of initial impacts to waters of the State.

### **Environmental Groups Comment 9:**

Comment: *"With regards to the debris dump sites, while it is certainly preferable from a water quality perspective that tires, appliances and old cars are removed from the drainages, the language in the MMP does not guarantee this action will occur. The MMP states, "During implementation, if it is determined that removing debris would cause instability in the drainage the material will be left in place." [emphasis added]*

*And under the Performance Criteria, "Indicate that all debris has been removed (unless specifically left in the creek channel to maintain stability)..." [emphasis added]*

*The MMP also includes the following language:*

*...the Applicant will remove debris from these areas allowing the natural environment to stabilize. Once the debris is removed the Applicant will seed the area as deemed necessary by the biologist, with a native seed mix sourced locally to prevent erosion and allow the natural plant and animal species to thrive in the area. [emphasis added]*

*And, "Once the debris is removed the Land Manager will reseed with a native seed mix in the debris removal area as deemed necessary by a qualified biologist, with native plants locally sourced to prevent erosion."*

*This approach is completely inadequate. First, the question of whether the debris can and will actually be removed, should be determined in advance of proposing the action as a mitigation measure. Second, plans for bank and creek bed stabilization should be prepared and included within the MMP. Photos of "Trash Removal" sites 1a, 1b, 4, and 5, provided in the MMP, show signs of significant bank erosion. The MMP should include measures that will specifically ensure further bank-slope erosion will not occur once the debris is removed from the creek bed. Will the areas of debris removal be temporarily fenced to promote success of any seeding efforts? As a side note, any "native seed mix sourced locally" should be approved by the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) in advance of its use."*

**RESPONSE:** The Trash Removal mitigation measure has been modified in the WMMP to include CDFW approval of the seed mix, temporary fencing as needed, and bank stabilization as needed. Additional monitoring of the cleanup areas after rain events has been included in the WMMP.

Additional mitigation may be required by the Central Valley Water Board and/or other agencies if it is determined that a majority of the debris cannot be removed without causing stream instability.

### **Environmental Groups Comment 10:**

Comment: *"The MMP discusses the creation of a breeding pond for the California tiger salamander. While the monitoring plan mentions specific depth and duration of ponding criteria, the plan does not consider the possibility of the CTS mitigation pond silting-in over time. It is impossible to determine from the information provided whether this is an issue for the site proposed. If it is, the MMP must acknowledge this concern, and discuss how this would be addressed in the long-term. The MMP should also include monitoring to determine if the pond is successfully used by CTS, and to ensure bullfrog do not utilize the pond during the CTS breeding season."*

**RESPONSE:** The CTS pools will be monitored twice a year to remove potentially harmful plants and wildlife (such as bullfrogs) as stated in Section 7.2.2 of the WMMP. The original size and dimensions of the pools will be used as the control to determine whether maintenance or repair of the pool is necessary, and the hydrology will be monitored to confirm ephemeral conditions favorable to CTS breeding. The pools will be preserved and managed in perpetuity.

---

### **KIM WILLIAMS COMMENTS**

---

#### **Kim Williams Comment 1:**

Comment: *"The Panoche Solar Project is currently under National Environmental Policy Act (NEPA) review. The Army Corp of Engineers (ACOE) has taken the lead. US Fish & Wildlife is the co-lead agency. According to Katarina Galacatos of the ACOE, the Draft Environmental Impact Statement (DEIS) has yet to be released for public comment and she does not know when it will be ready."*

**RESPONSE:** The commenter is concerned that the Draft EIS has yet to be released for public comment. The DEIS was public noticed on 14 September 2015. Additionally, see response to Environmental Groups Comment 2 above.

#### **Kim Williams Comment 2:**

Comment: *"The Project is also in the process of undergoing additional review under the California Environmental Quality Act (CEQA). San Benito County (SBC) released a Draft Supplemental Environmental Impact Report (DSEIS) for public comment and is currently working on compiling their response."*

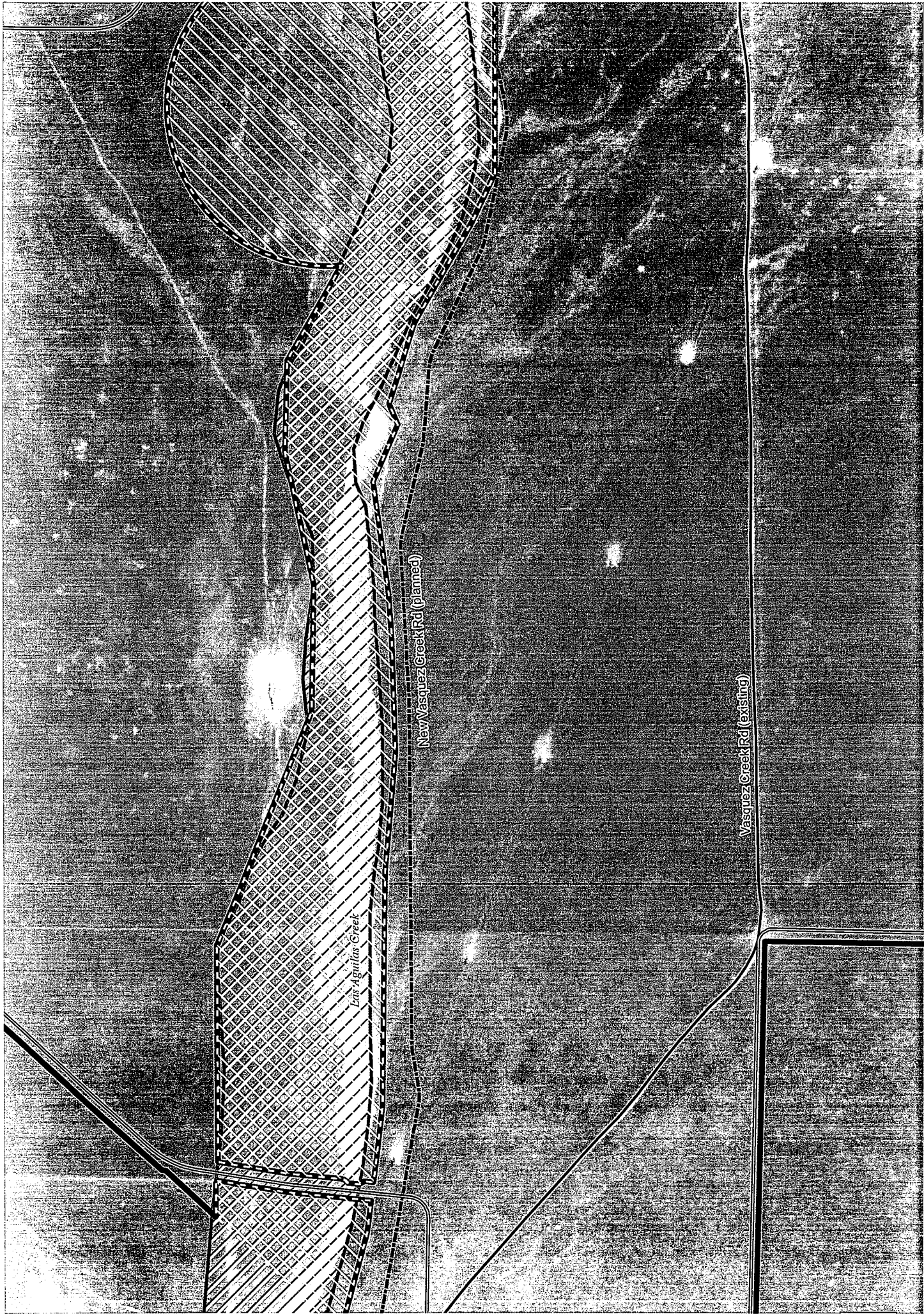
*Until the ACOE releases the DEIS, accepts public comments and responds, and until San Benito responds to public comments on the DSEIS, impacts to the waters of the United States and California will not fully be revealed. Therefore it is imperative under the Clean Water Act, Section 401 that the Central Valley Regional Water Quality Control Board (CVRWQCB) suspends the permit application review until such time that the Supplemental Environmental Impact Report (SEIR) and EIS have been finalized by San Benito County and the ACOE respectively."*

**RESPONSE:** See responses to Environmental Groups Comments 1 and 2 above.

**Kim Williams Comment 3:**

*Comment: "As revealed in the DSEIR that SBC released this year, this project poses a multitude of significant impacts to waters of the United States and CA that have yet to be thoroughly analyzed. One such impact is the New Vasquez Creek Road that the applicant would like to build immediately adjacent to Las Aguilas Creek, the largest waterway located within the project site. Not only would this road, (which will be used for property owners to access their homes located to the west of the project site and provide fire access) be located within the floodplain of Las Aguilas Creek, it would be so close to the bank as to cause extensive erosion, potentially displacing soil that would inhibit water flow."*

**RESPONSE:** The New Vasquez Creek Road is designed to suit the needs of the Project and to provide access for the landowners and rancher, not to meet fire department standards as the Project's perimeter road is for fire access. Attachment 1 shows the location of the new road and was included in Appendix 4B-8 (New Vasquez Creek Alignment) to the Final SEIR. As the figure illustrates, the new road is outside of the 100- year floodplain for Las Aguilas Creek and is not permanently impacting a water of the United States or a water of the State. Construction of the road will require implementation of best management practices for erosion and sediment control under the State Water Resources Control Board National Pollutant Discharge Elimination System General Permit For Storm Water Discharges Associated With Construction And Land Disturbance Activities, Order No. 2009-0009-DWQ. This measure is in addition to the numerous other mitigation measures that will be implemented to minimize erosion and impacts on sensitive species.



Legend

## **USFWS Biological Opinion**



# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Ventura Fish and Wildlife Office  
2493 Portola Road, Suite B  
Ventura, California 93003



IN REPLY REFER TO:  
08EVEN00-2015-F-0328

October 5, 2015

Michael S. Jewell  
Chief Regulatory Division  
Army Corps of Engineers, Sacramento District  
1325 J Street  
Sacramento, California 95814-2922

Subject: Biological Opinion for the Panoche Valley Solar Farm, San Benito County,  
California (File Number 2009-00443S)

Dear Mr. Jewell:

This letter transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion (Opinion) on the U.S. Army Corps of Engineers (Corps) proposal to issue a permit pursuant to section 404 of the Clean Water Act of 1972, as amended (33 U.S.C. 1344 et seq.) to Panoche Valley Solar, LLC (PVS, the Applicant) for the Panoche Valley Solar Farm (project) and the permit's effects on the federally endangered giant kangaroo rat (*Dipodomys ingens*), San Joaquin kit fox (*Vulpes macrotis mutica*), and blunt-nosed leopard lizard (*Gambelia silus*), and threatened California tiger salamander (*Ambystoma californiense*). In addition, you determined the proposed project may affect, but is not likely to adversely affect the federally endangered California condor (*Gymnogyps californianus*), vernal pool tadpole shrimp (*Lepidurus packardii*), Conservancy fairy shrimp (*Branchinecta conservatio*), and longhorn fairy shrimp (*Branchinecta longiantenna*), and the threatened vernal pool fairy shrimp (*Branchinecta lynchi*). There is no designated critical habitat for any listed species within the project site or that would be affected by the proposed project.

We received your June 6, 2014, request for formal consultation on June 9, 2014. Your request and our response are made in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

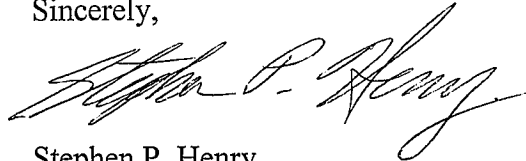
In the accompanying Biological Opinion, we conclude that the proposed project is not likely to jeopardize the continued existence of the giant kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard, and the California tiger salamander. We also concur with your determination that the proposed project may affect, but is not likely to adversely affect the California condor, vernal pool tadpole shrimp, Conservancy fairy shrimp, longhorn fairy shrimp, and the vernal pool fairy shrimp.

As a reminder, the incidental take statement (ITS) in this Biological Opinion is effective only if and when the federal action is completed for the proposed project addressed in this consultation. In other words, the exemption from the take prohibitions of section 9 of the Act only applies to activities carried out as part of the proposed action when the Clean Water Act section 404 permit is issued to the Applicant. The measures set forth in the ITS must become binding conditions of your permit to the Applicant in order for the exemption in section 7(o)(2) of the Act to apply. As you are probably aware, in the September 29, 2015, decision in *Sierra Club v. U.S. Army Corps of Engineers*, the D.C. Circuit Court of Appeals found that the Service's issuance of an ITS in its role as a consulting agency did not authorize incidental take, and that, as here, the Applicant can only rely on the safe harbor provided by the take exemption in section 7(o)(2) of the Act if the Terms and Conditions of the ITS have been included as binding, enforceable terms of the Corps' permit.

Incidental take applies to takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal action agency or by an applicant in accordance with the authorization issued by the Federal action agency. To ensure any activity is otherwise lawful, it should not be in violation of any applicable local, County, State, or Federal law. To that end, the Applicant should obtain all necessary permits and authorizations from all appropriate local, County, State, and Federal agencies prior to initiating project activities.

If you have any questions about the accompanying Biological Opinion or our joint responsibilities under the Endangered Species Act, please contact Christopher Diel of my staff at 805-644-1766, extension 305 or by e-mail at [christopher\\_diel@fws.gov](mailto:christopher_diel@fws.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Stephen P. Henry". The signature is fluid and cursive, with a long horizontal line extending from the end.

Stephen P. Henry  
Field Supervisor



# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Ventura Fish and Wildlife Office  
2493 Portola Road, Suite B  
Ventura, California 93003



IN REPLY REFER TO:  
08EVEN00-2015-F-0328

October 5, 2015

Michael S. Jewell  
Chief Regulatory Division  
Army Corps of Engineers, Sacramento District  
1325 J Street  
Sacramento, California 95814-2922

Subject: Biological Opinion for the Panoche Valley Solar Farm, San Benito County,  
California (File Number 2009-00443S)

Dear Mr. Jewell:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the U.S. Army Corps of Engineers (Corps) proposal to authorize Panoche Valley Solar, LLC (PVS, the Applicant) for the Panoche Valley Solar Farm (project) and its effects on the federally endangered giant kangaroo rat (*Dipodomys ingens*), San Joaquin kit fox (*Vulpes macrotis mutica*), and blunt-nosed leopard lizard (*Gambelia silus*), and threatened California tiger salamander (*Ambystoma californiense*). The Applicant proposes to place fill into 0.121 acre of ephemeral stream channels classified as "waters of the United States." The areas affected include Las Aguilas Creek on the western side of the project site and three unnamed drainages on the eastern side of the project site. In addition, the Applicant will potentially dredge approximately 0.096-acre of ephemeral stream channels during performance of compensatory mitigation activities on the Conservation lands. The Corps proposes to authorize this fill through issuance of a permit pursuant to section 404 of the Clean Water Act of 1972, as amended (33 U.S.C. 1344 et seq.). We received your June 6, 2014, request for formal consultation on June 9, 2014. Your request and our response are made in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

We have based this biological opinion on information that accompanied your June 6, 2014, request for consultation, including the biological assessment and addendums submitted to our office. We can make available a complete record of this consultation at the Ventura Fish and Wildlife Office.

As part of the request for consultation, you determined the proposed project may affect but will not likely adversely affect the federally endangered California condor (*Gymnogyps californianus*), vernal pool tadpole shrimp (*Lepidurus packardii*), Conservancy fairy shrimp

(*Branchinecta conservatio*), and longhorn fairy shrimp (*Branchinecta longiantenna*), and the threatened vernal pool fairy shrimp (*Branchinecta lynchi*).

The Applicant would implement the following measures to avoid adverse effects to California condor, vernal pool tadpole shrimp, Conservancy fairy shrimp, longhorn fairy shrimp, and vernal pool fairy shrimp:

1. All California condor sightings will be reported directly to the Service within 24 hours of the observation by the Project's Environmental Manager or Service-approved biologist.
2. Should a California condor be observed roosting within 0.5 mile of the construction area, no construction activity will occur within 0.5 mile of the observation between 1 hour before sunset to 1 hour after sunrise, or until the California condor(s) leave the area. The Applicant will coordinate with the California condor recovery program to determine whether any California condor is known to be roosting within 0.5 mile of the construction area.
3. Should condors be found nesting within 1.5 miles of the construction area, no construction activity will occur within 1.5 miles of the nest until further authorization from the Service. The Applicant will coordinate with the California condor recovery program to determine whether any California condor is known to be nesting within 1.5 miles of the construction area.
4. If a designated biologist observes a California condor land within the project footprint or Valley Floor Conservation Lands, the designated biologist will halt all work within 500 feet of the California condor until the bird has left the area on its own. If the bird fails to leave the area because of injury or other factors project proponent will contact the Service for direction.
5. All project-related electric distribution and substation structures will be constructed using Avian Power Line Interaction Committee (APLIC) protection guidelines. The APLIC-based avian protection guidelines are designed to reduce the operational and avian risks that result from avian interactions with electric utility facilities.
6. A 100-foot buffer will be established around the occupied habitat for vernal pool fairy shrimp.
7. Erosion control will be implemented to prevent sediment from entering occupied branchiopod habitat.

The proposed project is within the historical and expected future range of the California condor. California condors have not been recorded making flights through the proposed project area (Service 2015). The proposed project area provides potential foraging habitat for California condors. No suitable nesting habitat is within the proposed project area; however, the surrounding mountains and cliffs could provide suitable habitat.

One-hundred and twenty-one ephemeral pools were identified in the proposed project footprint, which were classified as ephemeral drainages in seasonal drainages (50 features, 1.88 acres), road puddle or roadside ditch (36 features, 0.22 acre), stock pond (5 features, 0.34 acre), trough puddles that were created by livestock around leaky troughs (15 features 0.13 acre), and vernal pools (15 features, 0.26 acre) (Live Oak Associates 2010a, 2010b).

During protocol vernal pool branchiopod surveys conducted in 2010, biologists identified vernal pool fairy shrimp in the project area (Live Oak Associates 2010a, 2010b). The vernal pool fairy shrimp were identified in two hydrologically connected pools within an unnamed tributary to Las Aguilas Creek. Protocol vernal pool branchiopod dry-season surveys conducted in 2010 confirmed the presence of vernal pool fairy shrimp in only the two pools; no vernal pool branchiopod cysts were identified elsewhere in the proposed project site (Live Oak Associates 2010a). The proposed project footprint was modified to exclude the occupied pools and a 100-foot buffer, now included in a noncontiguous portion of the Valley Floor Conservation Lands. Although potentially suitable habitat is present in the project area for Conservancy fairy shrimp, longhorn fairy shrimp, and vernal pool tadpole shrimp, the project area is outside of the known range of these species and they were not detected during the protocol surveys within the project area (Live Oak Associates 2010a, 2010b). A reconnaissance-level survey observed individuals of vernal pool tadpole shrimp in a pool in the Valadeao Ranch Conservation Lands however this location is approximately 35 miles from the nearest known location of the species (Live Oak Associates 2010c). Vernal pool tadpole shrimp are known to occur almost exclusively in the Central Valley of California and require large pool with a hydroperiod of a minimum of 25 days to mature and 54 days for reproduction (Ahl 1991, King et al. 1996).

Based on implementation of the aforementioned avoidance measures and the best available information regarding distribution of the California condor, vernal pool tadpole shrimp, Conservancy fairy shrimp, longhorn fairy shrimp, and vernal pool fairy shrimp, we concur with the Corps' determination that the proposed project is not likely to adversely affect the endangered California condor, vernal pool tadpole shrimp, Conservancy fairy shrimp, longhorn fairy shrimp, and vernal pool fairy shrimp. California condors have not been observed or recorded by transmitters to be making flights through the project site. Should the California condor's flight patterns extend into the project site in the future, the protective measures incorporated into the project and identified above should effectively avoid condor interactions and project impacts on California condors. The amount of California condor foraging habitat lost due to the project is small in relation to the available foraging habitat in the area and would not have appreciable adverse impact on condor foraging, should California condors occupy this area in the future. Protocol surveys failed to detect the presence of Conservancy fairy shrimp, longhorn fairy shrimp, and vernal pool tadpole shrimp on the project site. Because the project site lies outside of the known range of these species, it is unlikely they would occur there in future. Because the two pools within the project site occupied by vernal pool fairy shrimp will be protected by a 100-foot buffer, we do not expect the hydrology of the pools to be altered, or the species to be adversely affected, by implementation of the proposed project. There is no critical habitat for any listed species within the project site or that would be affected by the proposed project. If the proposed project changes in any manner that may affect a listed species or critical habitat, or if any listed species are found within or in the vicinity of the project area and could be adversely affected during the project implementation, you must contact us

immediately and the Applicant must suspend all activities until the appropriate level of consultation is completed.

### ***Analysis of Effects and Incidental Take Exemption***

The Corps has included the entire 2,506-acre project area and the compensatory mitigation activities in its scope of analysis under National Environmental Policy Act (NEPA). The Corps' Environmental Impact Statement (EIS) analyzes the direct and indirect effects of construction and operation and maintenance of the project following construction. When we analyze the Effects of the Action under the Act, we look at all of the direct and indirect effects the project would have on the listed species the biological opinion covers and how these effects would or would not result in jeopardy of the species. The proposed solar energy facility is expected to operate for approximately 30 years once constructed. At the end of the project's operational life, it would be decommissioned or potentially repowered with more efficient PV panels. Therefore, the jeopardy analysis in this biological opinion includes effects of operation, maintenance, and decommissioning or repowering (the effects of which are assumed to be similar to construction impacts) of the solar facility.

Federal action agencies have a continuing duty to regulate the activity covered by an Incidental Take Statement. In addition, the section 7 regulations contemplate the ability to reinstate consultation if any of several criteria are met; including exceeding the level of take we anticipate would occur. The incidental take exempted for this Federal action under section 7(o)(2) of the Act, as identified in the Incidental Take Statement, is co-extensive with and limited to the scope of the Federal action under review, which is construction, operation, and maintenance of the proposed solar project.

### ***Abbreviations/Acronyms/Definitions***

The following abbreviations, acronyms, and terms occur frequently throughout this document. We define them here for clarification.

Act	Endangered Species Act of 1973, as amended
ACEC	Area of critical environmental concern
ADSS	All-Dielectric Self-Supporting
APLIC	Avian Power Line Interaction Committee
Applicant	Panoche Valley Solar, LLC
BA	Biological Assessment
Biological monitor	Applicant-proposed observer who will work on-site to perform biological surveys or provide oversight of ground disturbing activities as needed and receive instruction from and report to the Applicant-proposed Designated Biologist
BLM	Bureau of Land Management
BMPs	Best Management Practices
CAL FIRE	California Department of Forestry and Fire Protection
CDFW	California Department of Fish and Wildlife
Corps	U.S. Army Corps of Engineers

County	San Benito County
Designated biologist	Applicant-proposed biologist(s), approved by the Service, knowledgeable and experienced in the biology and natural history of the threatened and endangered species on the project site, who will be responsible for monitoring construction activities to help minimize or avoid the incidental take of species and to minimize disturbance to their habitat. The biologist(s) may appoint biological monitors to perform biological surveys or provide oversight of ground disturbing activities as needed in their place. The designated biologist(s) would hold appropriate permits, pursuant to section 10(a)(1)(A) of the Act, for any activity involving handling, capture, relocation, etc., of listed species.
EIS	Environmental Impact Statement
LGIA	Large Generator Interconnection Agreement
NEPA	National Environmental Policy Act
O&M	Operations and Maintenance
OPGW	Optical Ground Wire
PG&E	Pacific Gas and Electric Company
Project	Panoche Valley Solar Farm
PV	Photovoltaic
PVS	Panoche Valley Solar, LLC
ROW	Right of Way
Service	U.S. Fish and Wildlife Service
Service-approved biologist	A biologist approved by the Service, at the request of the Corps, to conduct any avoidance, minimization, and conservation measures including surveying; monitoring; conducting training sessions; and capturing, handling, and relocating giant kangaroo rats or California tiger salamanders.
SCADA	Supervisory Control and Data Acquisition
SWPP	Stormwater Pollution Prevention Plan
TSP	Tubular Steel Pole

### ***Consultation History***

The Service has had numerous meetings with the project proponent, Corps, and California Department of Fish and Wildlife (CDFW) regarding the proposed project since 2009. The design of the project has changed several times with the change in project proponents since 2009. In April 2009, Solargen Energy contacted the Service regarding a proposed 420-megawatt solar project. In May 2011, the Service was notified that Solargen Energy had sold its assets to PV2 Energy on April 19, 2011. In August 2012, Duke Energy joined PV2 Energy as a partner in developing the proposed project. Duke was designated as the partnership's lead in coordination with the Service. In July 2014, Duke Energy notified the Service that they were no longer associated with the construction of the proposed project and would be removed from the consultation process. Panoche Valley Solar, LLC is the current Applicant. These changes to project design and species survey efforts have resulted in an atypical consultation history and

schedule. We can make available a complete record of this consultation at the Ventura Fish and Wildlife Office.

The following dates represent the milestones and records of the request for formal consultation between the Corps and the Service and the changes that occurred with the project Applicant.

- August 12, 2010: The Corps requests to initiate formal consultation for a 420-megawatt solar power project.
- October 5, 2010: The Service submits a response asking for clarification on the Corps' scope of analysis for the consultation, details of a new project design not included in the biological assessment, and the results of recent species surveys.
- December 10, 2010: The Service meets with Solargen Energy representatives to discuss outstanding data and survey needs.
- December 17, 2010: The Corps requests to initiate formal consultation for a 399-megawatt solar power project.
- February 18, 2011: The Service submits a response detailing the information needed for consultation as discussed and agreed upon during a meeting with the project proponent on December 10, 2010.
- April 19, 2011: PV2 Energy purchases the assets of Solargen Energy, thereby taking over as the lead developer of the project.
- November 4, 2011: The Corps submits a revised request to initiate formal consultation for a 399-megawatt solar power project.
- March 8, 2012: The Service submits a response summarizing the agencies' agreement from a February 17, 2012, conference call that formal consultation has begun but establishing a timeline was infeasible due to the incomplete NEPA process. It was determined that the NEPA alternative analysis would influence the final project for consultation.
- August 2012: Duke Energy joins with PV2 Energy in partnership for development of the project; Duke Energy would serve as the lead developer.
- June 6, 2014: Due to changes in the proposed project, the Corps submits a new request for formal consultation on the proposed solar power project.
- July 25, 2014: The Service is notified that Duke Energy has left the solar development partnership; Panoche Valley Solar, LLC takes over as the lead developer of the project.

- November 20, 2014: After receiving additional information on new project designs, including the telecommunication upgrades, the Service submits a letter acknowledging initiation of formal consultation. The acknowledgement letter also detailed the agency agreed upon schedule for formal consultation that would coincide appropriately with the NEPA process. The draft biological opinion would be scheduled for release to the Corps and the Applicant shortly after the release of the public draft of the environmental impact statement (EIS). The Service agreed to complete the final biological opinion for transmittal to the Corps 45 days after the end of the public comment period for the draft EIS.
- May 12, 2015: The Service is notified that the Corps will reassign the project from their San Francisco District Office to the Sacramento District Office.
- July 22, 2015: The Service received a modified project description from the Applicant.
- August 21, 2015: The Service transmitted a draft of this biological opinion to the Corps, who in turn also shared it with the Applicant.
- August 28, 2015: The Service received comments on the draft biological opinion from the Corps and the Applicant.
- August 31, 2015: The Service received a revised project description from the Applicant.
- September 1, 2015: The Service received another revised project description from the Applicant.

## BIOLOGICAL OPINION

### DESCRIPTION OF THE PROPOSED ACTION

#### *Summary of the Proposed Project*

Panoche Valley Solar, LLC (Applicant; PVS) proposes to develop and operate a 247-megawatt (MW) photovoltaic (PV) solar farm. The solar farm would consist of approximately 1,629 acres of PV panels installed on a 2,506-acre project site. PVS proposes to reduce the impacts of the solar farm on the San Joaquin kit fox, giant kangaroo rat, blunt-nosed leopard lizard, and California tiger salamander through implementation of avoidance and minimization measures and through the acquisition and protection in perpetuity of 24,185 acres of conservation lands. Construction of the solar farm is estimated to take approximately 18 months. Power generated by the solar farm would be delivered into the electrical grid via an existing Pacific Gas and Electric (PG&E) transmission line. Operation and maintenance of the project is expected to last 30 years. At the conclusion of the project's expected 30-year lifespan, the solar facility would either be decommissioned or repowered with more efficient PV panels.

### ***Location of the Project***

The proposed project consists of the project footprint (the location of the proposed solar power facility) in San Benito County and the proposed conservation lands, which span both eastern San Benito and western Fresno Counties. The project site is located approximately 0.75 mile north of the intersection of Panoche Road and Little Panoche Road in eastern San Benito County, California. The project site is bordered by rangeland on the north and south, by the Gabilan Range on the west, and by the Panoche Hills on the east. Panoche Creek and Las Aguilas Creek flow through the project site. A PG&E 230-kilovolt (kV) transmission line runs in an east-west direction through the project site.

### ***Proposed Project Features***

The proposed project would consist of a solar field of ground-mounted PV modules, an underground electrical collection system that converts generated power from direct current to alternating current, a project substation that collects and converts the alternating current from 34.5 kV to 230 kV, and a switching station that would deliver the generated power to the electrical grid via the PG&E Moss Landing to Panoche and Coburn to Panoche 230-kV transmission line. Upgrades to the PG&E primary and secondary telecommunications networks are also proposed by the Applicant.

Key features and areal extent of the proposed project are summarized in Table 1.

**Table 1**  
**Project Features**

<b>Project Feature</b>	<b>Area Impacted</b>
Solar arrays <sup>1</sup>	1,629 acres
Project perimeter roads (including pullouts)	30 acres
Substation, Switchyard, and O&M Building	12 acres
Graded Areas <sup>2</sup> (outside of other project features)	106.5 acres
230 kV Loop-in Tubular Steel Poles (TSPs)	250 square feet
Trenching and foundations adjacent to arrays	12.41 acres
Perimeter Fencing	0.06 acre
Vasquez County Road	4 acres
<b>Total Permanent Disturbance</b>	<b>1,794 acres</b>
<b>TOTAL PROJECT FOOTPRINT</b>	<b>2,506 acres</b>

1 Includes 2.33 acres for foundations, 26.64 acres of direct current trench, 8.84 acres of alternating current trench, 205.47 acres of grading, and 1,385.72 acres of solar array work areas. Solar panels and associated electrical equipment would be installed on approximately 185,000 support post foundations. Posts would be steel I-shaped sections with a cross sectional area of 4.5 square inches each.

2 Limited grading is expected to be required because of the nearly flat terrain. Grading would be required on slopes greater than 3 percent for PV power blocks. Final grading plans for the project are under development; however, the proposed project includes approximately 358 acres (205.47 acres for arrays; 30 acres for roads; 12 acres for the substation, switching station and O&M building; 4 acres for Vasquez County Road; and 106.53 acres for other grading areas) of proposed area that would be graded.

3 Vasquez County Road would be replaced with a new road that would run outside of the project fence line south of Las Aguilas Creek.

### Solar Project Components

PV panels would be installed on approximately 1,629 acres of the project footprint.

Approximately 360 acres of the project area would be graded. The proposed project would be installed in a clockwise progression beginning near the new substation location south of Las Aguilas Creek and west of Little Panoche Road (see Appendix B, (PVS 2014)). A single-axis tracker system would be used to support the PV panels. Each PV panel would be approximately 3 feet by 6 feet. Panels would be a maximum of 10 feet high at the point of highest tilt, and panel faces would be non-reflective and black or blue in color and mounted on direct-driven steel support structures up to 15 feet long. Steel poles may be placed in holes backfilled with concrete if difficult soil conditions are found based on additional geotechnical evaluations. Rows of panels would be spaced 10 to 35 feet apart to prevent shading of adjacent rows. Rows of panels would be configured into power blocks connecting to an inverter system to convert the direct current energy produced by the panels to alternating current energy that is required for electric transmission. The facility would consist of 145 1.67-MW power blocks and 6 0.83-MW power blocks. Each power block would be up to 520 feet by 90 feet.

The medium voltage collection lines would begin at the inverter-transformer foundation and would be located underground in trenches until the output from between 8 and 10 power blocks terminates in the collection breaker of the substation. The 34.5 kV collection wires located in the areas that are a distance of 1,000 feet or more from the collection breakers in the switchyard and outside the PV field may be mounted overhead on standard wood or steel poles along the site boundary. These poles would be approximately 25 feet in height and spaced about 250 feet apart. The most recent Avian Power Line Interaction Committee (APLIC) guidelines for avian protection will be followed on overhead structures and lines.

An electric substation would include transformers to convert power from 34.5 kV to 230 kV. The substation would be located north of the existing PG&E transmission line on the west side of Little Panoche Road. A new on-site access road would be constructed to serve the substation as well as an approximately 1-acre fenced in parking area. The substation would connect to a PG&E switching station, which would include an approximately 100-foot tall microwave tower. The substation and switching station area would be graded and compacted to an approximately level grade. One or more concrete pads would be constructed as foundations for equipment and structures and the remaining area would be primarily graveled or paved. Electrical transformers, switchgear, and related facilities would be designed and constructed to transform medium-voltage power from the project's delivery system to the existing 230 kV transmission line.

Each of two substation transformers would contain approximately 12,500 gallons of mineral oil, and the substation would be designed to accommodate an accidental spill of transformer fluid by the use of a concrete foundation with containment. A modular protection automation and control building for PG&E's switching station control and protection equipment would be located at the switching station site. A substation protection and control building would house the substation relaying and Supervisory Control and Data Acquisition (SCADA) equipment near the substation site.

There would also be a PV Plant Operations and Maintenance (O&M)/control building to house the plant system's relay, protection, and SCADA equipment. Worker parking would be provided in a designated area near the O&M building. The 1,800-square-foot O&M and control facility would be constructed, consisting of a standard steel building on a concrete slab. The facility would provide operations equipment and parts storage, security, and site monitoring.

Project roads would be limited to a 20-foot-wide perimeter road with pullouts every 2,500 to 3,000 feet. Pullouts would be approximately 20 feet wide by 300 feet long. Interstitial space between rows of panels would be used as transportation corridors between the rows of panels as needed for maintenance and access for site safety. Portions of the transportation corridors would be maintained vegetated or dirt paths to ensure needed access. An additional transportation corridor, a maintained fenced-off dirt path, would be placed south of Aguilas Creek but north of the perimeter fence line. This transportation corridor would provide access to the western portion of the Valadeao Ranch Conservation Lands from Little Panoche Road for landowners and ranchers. The perimeter road for the project would cross Las Aguilas Creek in one location. In addition, the perimeter road would cross three unnamed drainages on the eastern side of the project footprint.

The perimeter road designed for site and emergency access for the project would cross Panoche Creek in two locations and Las Aguilas Creek in one location (See Appendix C; PVS 2015). In addition, the perimeter road would cross three unnamed drainages on the eastern side of the project footprint. PVS would span the Las Aguilas Creek crossing using a single-span bridge.

Security fencing would be constructed around the project footprint. The chain-link fence will have a 5- to 6-inch gap along the bottom of the fence that would allow wildlife to travel through the site and link up with the existing travel corridors. The fence would be smooth-top chain link in the upper portion and smooth wire in the bottom portion. Temporary fencing may be placed around construction staging areas.

Temporary wildlife exclusion fencing would be placed around construction staging areas for wildlife protection at the discretion of the Designated Biologist. The primary function of the temporary species exclusion fencing is to prevent special status species from entering the construction sites. Wildlife exclusion fencing would be installed before any ground disturbance, equipment laydown, site preparation, or construction activities as deemed necessary by a designated biologist. The exclusion fencing will be equipped with one-way exits every 250 to 500 feet to avoid entrapment of animals inside the fence. The exclusion fencing would be removed after the completion of construction in the area.

To accommodate water usage during construction, PVS proposes to construct two temporary construction water ponds with a capacity of approximately 13.5 acre feet, along with three temporary 20,000-gallon water tanks. Temporary exclusionary fencing would be installed around the pond. The temporary pond would be removed at the end of construction. Temporary piping would be used to transport water from the pond to drop tanks at designated locations around the project site. Permanent piping would be installed from permanent water storage tanks to the O&M building for use during operations, including providing water to the fire suppression system. Four permanent 4,000-gallon water tanks would be located near existing well sites; this

water would be used for washing solar panels, to provide water for facilities in the O&M building, and as part of the fire-fighting system.

### Interconnection and Network Upgrades

Actions related to the interconnection and network upgrades are interrelated to the construction of the solar generation facility. PVS has signed a Large Generator Interconnection Agreement (LGIA) with PG&E. The LGIA allows PVS to connect to the existing 230-kV transmission line. The LGIA also details necessary telecommunication systems upgrades, for which PVS would be responsible. PG&E, instead of PVS, may conduct some of the activities described below through the contractual relationship established in the LGIA; however, PVS will remain responsible for implementation of all avoidance and minimization measures. Maintenance of the 230-kV transmission line and switching station is outside the scope of the proposed project and this consultation; any such work would be conducted by PG&E, which would seek independent regulatory and permitting compliance for such work.

The proposed project would interconnect to the regional electricity grid at the existing PG&E Moss Landing–Panoche/Coburn-Panoche 230-kV transmission line on the proposed project site. The primary interconnection facility for this project would be a switching station located to the north of the existing PG&E transmission line on site. The switching station, to be called the Las Aguilas switching station, would be constructed by the Applicant, and ownership would be transferred to PG&E.

Four pairs of new tubular steel poles would be required to interconnect the proposed project: two pairs in the existing transmission right-of-way and one pair on either side of the PG&E switching station. There would be four temporary work areas to allow for construction of up to eight approximately 135-foot-tall tubular steel poles. The tubular steel poles would facilitate connection of the conductor from the two existing 230kV transmission towers into the project switching station. Additional poles may be required once final design is complete; however, the number of poles would not exceed 12.

All ground-disturbing work associated with the construction of the new tubular steel poles that would loop into the switching station would be performed within the project footprint. Before installation of the tubular steel poles foundations, PVS would perform all required clearances for biological resources.

Two lattice towers would be removed from within the project footprint in the existing PG&E right-of-way. The tower foundations would be demolished to approximately 3 feet below grade. There would be an estimated three transmission line structures approximately 80 feet high connecting the generation tie line from the project substation to the project switchyard.

### Primary Telecommunication Network Upgrades

PG&E would install new optical ground wire (OPGW) on its existing Panoche-Moss Landing 230 kV transmission line to establish the primary telecommunication service between the project switching station and PG&E's existing Panoche Substation, which is located 17 miles east of the

Panoche Valley in Fresno County. Of the 17 miles of OPGW, approximately 10 miles are in Fresno County and 7 miles are in San Benito County; approximately 8 miles (in both Fresno and San Benito Counties) are on Federal lands administered by the U.S. Bureau of Land Management (BLM).

PG&E proposes to replace the existing shield wire and install the OPGW on the north side of the 230-kV towers, at the top of each tower. PG&E estimates that 12 temporary pull/reel and splice sites would be established along the existing 17-mile transmission line corridor. Each splice and pull/reel sites would require an approximate 75-foot by 75-foot work area located mid-span of existing tower sites within the existing transmission corridor right-of-way.

The OPGW installation along the 17-mile segment would be completed in approximately 12-16 weeks, and at any one location the construction would take from 2 to 3 weeks. Existing roads and access along the transmission line would be used to install the OPGW.

The locations of the pull/reel sites have been identified through a combination of helicopter and ground surveys and a review of aerial imagery. PG&E would use the following criteria to select the final pull/reel sites: accessibility for vehicles, presence of flat or nearly flat land adjacent to existing transmission line route for equipment set-up, existing land use, absence of or minimal habitat for sensitive species, and the absence of resources that would restrict work.

Preparation of the temporary pull/splice sites would require some minor ground disturbance. Minor structural modifications would also be made to each of the transmission towers to allow the mounting of splice boxes where the sections of OPGW would be spliced (every 3 to 5 miles). Access to pull/reel sites and to each transmission tower would occur generally along existing unimproved roads or improved un-surfaced or surfaced roads that lead to many of the existing towers. No new roads would be constructed to access tower locations. Helicopters would be used to place materials at the point of installation for towers inaccessible by road.

At each of the 75 existing towers along the 17-mile 230-kV transmission line route, minor upgrades to the steel attachments on the towers would be required to accommodate installation of the OPGW. These upgrades would include only overhead work on the existing tower, such as replacement of the gode peaks with a pulley to accommodate the OPGW. The existing static wire would then be used to pull the new OPGW through each tower pulley. Existing roads or helicopters would be used to provide access to the sites necessary to fashion the attachments needed on each tower.

Helicopters would be used to transport electrical workers to the towers, deliver materials, and assist in pulling the OPGW from tower to tower. Approximately four 150- by 100-foot landing zones would be constructed approximately 5 miles apart using means similar to pull sites. Establishment of these landing zones would involve minimal temporary ground disturbance and would facilitate the use of helicopters and reduce overall impacts associated with the work. Landing zones would primarily be used for staging materials, picking up and transporting electrical personnel and equipment, and refueling helicopters.

Overhead crossings of public roadways or existing transmission or distribution lines would require the use of approximately 11 temporary guard structures at 7 crossings. The temporary guard structures would be designed to prevent tools or materials from falling into the roadway or utility. Guard structures typically consist of two to four wooden poles and cross beams attached between the poles. They are generally installed in pairs with a net strung between them, but in some cases a net would not be required. A PG&E line truck would be used to auger and set the wooden poles. For roadway crossings, PVS anticipates that the temporary poles would be placed in or adjacent to the disturbed road shoulder in an approximately 75-foot by 75-foot area. No grading or vegetation removal is anticipated associated with installation of the guard structures. Guard structure poles would be removed following OPGW installation and the holes would be backfilled.

The existing 230-kV transmission line crosses under two existing 500-kV transmission lines approximately 1.5 miles west of the Interstate 5 crossing. At this crossing, PG&E would splice in All-Dielectric Self-Supporting (ADSS) fiber optic cable from the 230 kV towers to the east and west sides of the 500-kV transmission line corridor and attach the ADSS to existing wood distribution poles. The ADSS would replace the OPGW for this 4,650-foot section.

To support the added weight of the ADSS, PG&E would replace approximately 12 wood poles with 12 new wood poles in the same locations. These poles are within the PG&E right-of-way on agricultural land. To replace the poles, a 30-foot by 40-foot work area would be required to accommodate one crew truck and a trailer truck to bring each pole to the site and a line truck to auger a hole approximately 8 feet deep and 2 feet wide. In addition, ADSS would be trenched from the easternmost 230-kV tower along an existing dirt road to the first distribution pole location. From the westernmost 230 kV tower to the distribution pole, the ADSS will run overhead approximately 100 feet.

Table 2 summarizes the total ground disturbance associated with the PG&E primary telecommunications upgrades.

**Table 2**  
**Primary Telecommunications Site Disturbance**

<b>Work Area Description</b>	<b>Total Impact (acres)</b>
Temporary pull/splice sites (12 sites – 75 feet x 75 feet)	1.54
Temporary landing zones (4 zones – 150 feet x 100 feet)	1.38
Temporary guard structures (11 structures – 75 feet x 75 feet)	1.42
Wood pole temporary work areas (12 areas – 30 feet x 40 feet)	0.36
ADSS underground temporary work area (1,200 feet x 37.5 feet and 30 feet x 400 feet)	1.03
<b>Total</b>	<b>5.73 acres</b>

To meet PG&E's communications reliability standards, two redundant communication paths are required. The microwave path would start at the project switchyard, where a new 100-foot microwave tower would be constructed. The path would continue to an existing California Department of Forestry and Fire Protection (CAL FIRE) microwave tower at Call Mountain, then to an existing American Tower Corporation at Panoche Mountain. The microwave path

would then terminate at a new approximately 100-foot microwave tower to be constructed at PG&E's existing Helm Substation in Fresno County. The new microwave towers at the project switching station and the Helm Substation would be within the fence lines of each site. The proposed tower at the project switching station would be a self-supporting, three-legged Valmont tower, and the proposed tower at Helm Substation would be a self-supporting, four-legged Valmont tower.

Distribution power already exists at microwave tower sites, so no new poles would need to be installed to provide power. In addition, existing roads would be utilized to access the proposed microwave tower sites, so no new roads would be constructed to bring equipment and materials to the work site.

Table 3 summarizes the total ground disturbance associated with the PG&E secondary telecommunications upgrades.

**Table 3**  
**Secondary Telecommunications Site Disturbance**

<b>Work Area Description</b>	<b>Total Impact</b>
Microwave site permanent work area for new towers (2 areas – 100 feet x 100 feet)	0.46 acre
Microwave towers (2 towers – 100 feet x 100 feet)	0.46 acre
<b>Total</b>	<b>0.92 acre</b>

The Applicant and PG&E will implement the following measures to avoid and minimize potential impacts on special status species, including giant kangaroo rats, San Joaquin kit foxes, blunt-nosed leopard lizards, and California tiger salamanders, during the interconnection and telecommunication upgrade portions of the project:

1. The development of new access and right-of-way (ROW) roads will be minimized, and clearing vegetation and blading for temporary vehicle access will be avoided.
2. During fire “red flag” conditions, as determined by CAL FIRE, welding will be curtailed, each fuel truck will carry a large fire extinguisher with a minimum rating of 40 B:C, and all equipment parking and storage areas will be cleared of all flammable materials.
3. Personnel will avoid burrows occupied or potentially occupied by federally listed species as identified by a designated biologist. If a federally listed species is observed, the Applicant will proceed using one of the following options as determined by a designated biologist:
  - a. A designated biologist will stake and flag an appropriate work-exclusion zone and remain on-site until construction is complete or stake and flag an appropriate work exclusion zone around active burrows prior to covered activities at the job site. The work-exclusion zone will be a 50-foot buffer or as determined by the designated biologist as necessary to avoid impact to occupied burrows.

- b. If work must proceed in the exclusion zone due to limited space of the telecommunication right-of-way, crews will implement techniques to minimize direct mortality, including using designated biologists to trap and hold the species in captivity, and excavating and closing burrows. The designated biologist will hold a permit, pursuant to section 10(a)(1)(A) of the Act, for the species to be excavated. The designated biologist will release the mammals upon completion of work.
4. If San Joaquin kit fox dens are present, their disturbance and destruction will be avoided where possible. However, if dens are located within the proposed work area and cannot be avoided during construction, designated biologists will determine if the dens are occupied. If unoccupied, the designated biologist will remove these dens by hand excavating them in accordance with Service procedures (U.S. Fish and Wildlife Service 1999). The avoidance buffers will follow will follow Service standards or will be determined on a case-by-case basis in coordination with Service and CDFW.

### ***Solar Project Site Design & Engineering***

Construction in the project footprint would include the perimeter roads and emergency access/egress points, maintenance transportation corridors, the substation and switchyard, O&M facility, parking areas, collector lines, solar array footers, and equipment pads.

Grading would be required on approximately 360 acres for construction of PV power blocks with the general layout for trenching of underground electrical lines and maps of the perimeter access roads and other permanent facility components. Solar panels and associated electrical equipment would be installed on approximately 185,000 support post foundations. Posts would be steel I-shaped sections with a cross sectional area of 4.5 square inches each. Concrete foundations associated with inverters and MV transformers would impact approximately 96,000 square feet (151 foundations total). Combining switchgear concrete foundations would disturb approximately 9,000 square feet (11 foundations). The entire substation, switchyard, and O&M building areas would be prepared through grading, installation of concrete foundations, placement of a gravel base, and drilled concrete piers. Laydown areas would be located along Little Panoche Road near access points for the construction team. These areas would be graded and covered with aggregate material to allow for use of these areas during operation of the project. Laydown areas will be restored to pre-project conditions after construction. The existing Vasquez Road would be replaced with a new road that would run outside of the project fence line south of Las Aguilas Creek. Permanent impacts of project construction would total 1,94 acres (Table 4).

In addition to permanent impacts from project infrastructure, temporary impacts associated with construction of permanent project features and material and equipment staging would take place on the site. Temporary impacts caused by project construction would total 712 acres (Table 5).

Road construction buffers assume approximately 10 feet to 30 feet of temporary disturbance along perimeter roads, Vasquez Road, and the perimeter fence. Temporary work areas necessary for installation of crossings over Federal jurisdictional waters would be outside of the ordinary high water mark.

Areas of temporary disturbance would be restored in accordance with a revegetation plan to be developed prior to project construction. Disturbed areas would be recontoured, where appropriate, and planted with an approved seed mix. All seed mixtures would be certified “weed free.” Noxious weeds would be controlled through implementation of a Weed Control Plan. Herbicides used for noxious weed control would be applied in accordance with Federal and State regulations.

**Table 4**  
**Permanent Disturbance**

<b>Work Area Description</b>	<b>Total Impact</b>
Solar arrays	1,629 acres
Project perimeter roads (including pullouts)	30 acres
Substation, Switchyard, and O&M Building	12 acres
Graded Areas*	360 acres
230 kV Loop-in Tubular Steel Poles (TSPs)	12 2-foot diameter TSPs
Collector Lines (block feeder and switchgear feeder)	192,500 linear feet
Perimeter Fencing	99,575 linear feet
Vasquez County Road	4 acres
<b>Total</b>	<b>1,794 acres</b>

\* Graded Areas total does include areas that overlap with other project elements. The total graded area for the project includes approximately 360 acres (205.47 acres for arrays; 30 acres for roads; 12 acres for the substation, switching station, and O&M building; 4 acres for Vasquez County Road; and 106.53 acres for other grading areas).

**Table 5**  
**Temporary Disturbance**

<b>Work Area Description</b>	<b>Total Impact</b>
Road and Perimeter Fence Construction Buffers	72 acres
Federal Crossing Work Areas	4 acre
Work Areas and Buffers	527 acre
Construction pond	1 acre
Temporary Laydown Areas	108 acres
<b>Total</b>	<b>712 acres</b>

### Solar Project Construction

The project would be constructed in a general clock-wise progression around the site over approximately 18 months. Construction work would begin near the proposed substation location south of Las Aguilas Creek and west of Little Panoche Road. Construction activities would be permitted from sunrise to sunset, as published by the National Oceanic and Atmospheric Administration, as early as 5:00 am to as late as 9:00 pm. No ground-disturbing activities would take place at night. From 7:00 pm to 7:00 am, generators within 350 feet of the project boundary would not run at 100 percent load, or would be less than 40 A-weighted decibels (dBA) at the property line.

Nighttime activities on the project site would be limited to minor non-ground-disturbing actions such as the following:

- Commissioning and maintenance activities to be performed when PV arrays are not energized
- Interior use of the operations and maintenance facility
- Unanticipated emergencies
- Special status species impact avoidance and minimization activities and research (e.g., giant kangaroo rat trapping and San Joaquin kit fox radio telemetry)
- Security patrols

No work would be completed during severe rain events unless it is required, such as an imminent threat to life or necessary sensitive species work. A designated biologist or biological monitor would be present during all construction activities. A designated biologist is a person with knowledge and experience in the biology and natural history of the threatened and endangered species on the project site, proposed by the Applicant to be responsible for monitoring construction activities to help minimize or avoid the incidental take of species and to minimize disturbance to their habitat. This biologist may appoint biological monitors to perform biological surveys or provide oversight of ground disturbing activities, as needed, in their place. A designated monitor is an Applicant-proposed observer who would work on-site to perform biological surveys or provide oversight of ground disturbing activities as needed and that receive instruction from and report to the Applicant-proposed designated biologist.

#### Site Preparation

Site preparation would mainly include pre-construction biological surveys, burrow excavation, relocation of special status species, construction of the perimeter road, intermittent stream crossings, and implementation of storm water best management practices (BMPs). Project grading requirements are anticipated to result in cut-and-fill activities with no export of materials. Aggregate would be imported for the permanent road, switching station, and the substation.

The majority of the PV array areas will not require ground preparation. However, for areas that overlap with the graded areas, preparation would involve trimming grassland vegetation (as needed), agricultural disking, harrowing, and/or rolling of PV array areas, selected compacting, and grading. For the majority of the project footprint, the ground under the PV arrays would not require grading or any land preparation, except for areas that are greater than 3 percent slope. Preparing the ground beneath PV arrays would begin by trimming existing vegetation, if required. Approximately 360 acres of the project footprint are expected to be graded.

#### Panel Assembly and Installation

Panel components, such as the PV panels and racks, would be transported by truck to the laydown areas and then distributed throughout the project footprint using various forms of rolling stock. During construction and installation, all traffic would enter the project footprint at specified access points along Little Panoche Road.

A prefabricated racking system would arrive on-site to be assembled and grounded at the site. Preassembled PV panels would be placed in a staging area inside or on shipping containers. Panels would be put in place manually and secured to the rack according to vendor specifications. The rack would be populated with panels, wired in series, and connected to a direct combiner box, which would deliver direct current power to the inverters. Equipment used for system installation would include forklifts, all-terrain vehicles, truck-mounted pile drivers, cranes, and pick-up trucks.

Approximately 108 acres are planned for laydown and staging. The laydown areas would require a power source for lighting, construction trailers, and parking. There would be no hazardous substances stored on-site outside of approved containment measures.

### Construction Personnel

The workforce at the project would vary based on activity at the site during the course of construction. Nighttime activities would have crews of 20 to 50. Daytime crews would range from 100 to 500 individuals. There would be no on-site temporary workforce housing, and parking of employee recreational vehicles or trailers would be prohibited.

### Personnel Traffic

As described above, the workforce for the project would vary based on activity at the site during the course of construction. PVS expects approximately 1,150 vehicles trips per day during project construction. This total includes construction workers driving to/from the site, truck traffic for equipment and other loads, security patrols, and biological monitors.

All truck traffic and deliveries, along with approximately 40 percent of personal vehicle traffic, would enter the site from the north on Little Panoche Road. To accommodate the increased daily traffic volume and decrease safety risks to personal traffic, the remaining personal vehicle traffic would enter the site from the west on Panoche Road.

### Delivery Traffic

Routes for trucks hauling materials and construction equipment would primarily follow the I-5 corridor to Little Panoche Road, allowing for safer travel by larger container trucks and wide-load trucks carrying heavy equipment. It is anticipated that material deliveries would occur via I-5. Smaller deliveries may arrive to the site via Hollister and/or via county roads.

### Vehicles Entering and Traversing the Site

During installation, traffic would enter the site at the specified laydown areas. Vehicles would travel along Little Panoche Road and Panoche Road. Vehicles needed for installation of PV panels would travel on both permanent and temporary site roads of compacted native soil. These vehicles would include trucks, drilling rigs, forklifts, water trucks, and cranes for lifting inverters onto piers.

### On-Site Telephone and Data Service

Telephone and internet services to the project site would be provided by AT&T utilizing existing AT&T services located 2,000 feet south of the project site along Little Panoche Road. New underground cable would be installed in the public road shoulder from the existing connection point to the project site. Installation would include construction of a 2-foot-wide by 3-foot-deep trench to allow direct burial of the cable in compliance with State and local standards.

Alternatively, the cable could be attached to existing wood distribution poles along the road from the existing AT&T connection point to the project site.

### Landscape Design

Landscaping in disturbed areas would use native plant stock whose origin is close to the project area. Salvaged topsoil would be used to promote re-establishment of existing plant communities from the existing seed bank if available. Erosion and sediment control measures would be implemented in revegetated areas to minimize soil movement and improve the potential for revegetation. If revegetation cannot be conducted immediately following completion of construction, appropriate interim erosion control measures, as detailed in the SWPPP, would be installed until revegetation occurs. Examples of interim erosion control measures include certified weed-free straw mulch, fiber rolls, or straw bale barriers.

### Erosion Control

A stormwater pollution prevention plan (SWPPP) outlining the various BMPs for minimizing erosion and runoff would be prepared prior to project construction. Typical erosion control devices would be used, including the following:

- Sandbags, straw bales, and temporary de-silting basins for project grading and construction during the rainy season (October 15–April 15) to prevent discharge of sediment-laden runoff into storm water facilities;
- Revegetation as soon as practicable after completion of grading to reduce sediment transport during storms;
- Installation of straw bales, wattles, or silt fencing around the perimeter of graded building pads for construction during the rainy season; and
- Structural BMPs (e.g., grease traps, debris screens, and oil/water separators) incorporated into substation design to minimize potential for contaminated storm water to leave the substation.

### Fire Safety

Vegetation at the site would be kept to a height of less than approximately 18 inches. Short-duration intensive grazing by sheep may be used to maintain vegetation, depending on the amount of forage available on the site. The number of sheep required to appropriately graze the feed produced on the project site would vary seasonally depending on the rainfall and temperature of each grazing season. During normal rainfall years, anywhere from 1 to 3 bands of sheep (with each band consisting of between 750 and 1,200 adult sheep and offspring,

depending on the season) would graze the project site during the winter and spring months (January to May) to use the amount of forage produced prior to and during that season. PVS would construct new sheep fencing as necessary. The sheep would be removed from the site during the remainder of the year. Interstitial space between rows of panels would be used as transportation corridors between the rows of panels as needed for maintenance and access for site safety. Emergency egress and access the perimeter roads for the project would cross Panoche Creek in two locations and Las Aguilas Creek in one location (PVS 2014).

### ***Operations and Maintenance***

The proposed project would be in operation for at least 30 years, with the possibility of a subsequent repowering for additional years of operation. The facility would operate 7 days per week during daylight hours. Operational activities would consist of monitoring system operational status, performance, and diagnostics from the control room in the O&M building.

### **Security**

The project would be fenced to prevent access by the public to ensure public safety and protect equipment from theft and vandalism. Gates would be installed at all site access roads. PVS would provide 24-hour security at the site, along with maintenance personnel capable of responding to any upset conditions or other emergencies. Security staff would routinely traverse the site in lightweight vehicles and all-terrain vehicles.

### **Maintenance**

Once installation is complete and the site is fully operational, all traffic would enter the site at the switchyard location off of Little Panoche Road. The facility would be restricted to O&M staff, security personnel, and PVS authorized guests. The O&M staff would use light-duty vehicles and all-terrain vehicles for traversing the site along transportation corridors.

The PV panels would be washed up to twice annually during the dry season. Inverters would be checked twice annually for general component maintenance. Panel washing would require an estimated 2.84 acre-feet of water annually. The panel washing crew would traverse the site in a small all-terrain vehicle fitted with a trailer containing a water tank and a high-pressure sprayer.

The PV arrays would be inspected once annually for degrading wires, panels, and combiner boxes, as well as for mechanical fastener tightening. The SCADA system would also identify underperforming system components; and these components would be checked as required.

Damaged or underperforming PV panels and mechanical fasteners would be replaced as required. Underperforming inverters would be serviced or replaced as required.

### **Erosion Control**

During project operation, a vegetated understory composed of native plant species consistent with existing vegetation would be planted under the panels. The vegetation height would be

minimized by planting slow-growing grasses native to the region and through short-duration intensive grazing by sheep, described under Fire Safety, below.

### ***Decommissioning or Repowering***

The project would be in operation for at least 30 years, with the possibility of a subsequent re-powering of the project for additional years of operation. Upon its eventual decommissioning, PVS or its successor in interest would be responsible for the removal and disposal of all solar arrays, inverters, transformers, fences, roads, and other structures on the site. The switching station and associated infrastructure would become a permanent asset of PG&E's electrical transmission system. Any decommissioning plan for the solar project would exclude PG&E owned facilities.

### ***Applicant Proposed Conservation Measures/Conservation Package***

PVS has proposed the following general and species-specific conservation measures to minimize impacts to biological resources which may occupy the project footprint.

#### **General Applicant Proposed Avoidance and Minimization Measures**

PVS will implement the following measures to avoid and minimize potential impacts on special status species during construction, operations, and maintenance:

1. Before construction activities begin, PVS will submit to the Service for approval the name, qualifications, business address, and contact information of one or more designated biologists responsible for surveying, monitoring, or implementing any avoidance or minimization measures. PVS will ensure designated biologists are experienced in the biology and natural history of all special status species on the project site. The designated biologist will be responsible for monitoring construction activities to minimize or avoid incidental take of individual species and to minimize disturbance of special status species' habitat. The designated biologist may appoint monitors to perform biological surveys or to oversee ground-disturbing activities. All on-site biological monitors will receive instruction from and will report to the designated biologists.
2. Before beginning work on the project site all project personnel will be required to participate in an environmental education program. Topics will include: occurrence and distribution of special status species within the project area; minimization and avoidance measures; reporting requirements if any listed species is injured or killed; and, applicable definitions and prohibitions under the Act and other measures regarding federally-listed species. This education program will be designed to ensure all personnel who work at the project site are aware of and can identify the federally- and State-listed species and measures to protect them. As part of this training, all project personnel will receive the contact names and numbers to report incidents involving federally- and State-listed species. On completion of the program, the employees will be given a badge or hard hat sticker for admittance to the project site. An environmental education program

attendance log with the names and dates of all personnel who completed the program will be maintained by the Applicant.

3. Posters with English and Spanish text and showing pictures of special status species, with information and protocols to be followed, will be placed in conspicuous locations, such as construction trailers.
4. A designated biologist or their representative biological monitor will conduct a preconstruction survey prior to any activity that could result in ground disturbance. The biologist will identify and clearly mark areas where federally-listed species were identified and where dens or burrows and habitats of special status species are to be avoided. Buffers will be established with highly visible markers. When burrows or dens could be damaged (occurring within 50 feet of project activities), a designated biologist will determine when special excavation procedures are necessary to protect special status species and when they are not necessary. If relocation of sensitive species is permissible, then the appropriate relocation plans will be followed.
5. Designated biologists or their representative biological monitor will be present during all ground-disturbing activities. In addition to conducting preconstruction surveys, the biologists will aid crews in implementing avoidance and minimization measures, documenting weekly all pertinent information concerning action effects on special status species, and helping minimize the adverse effects of project activities on special status species.
6. Designated biologists and biological monitors will have the authority and obligation to order cessation of activities if avoidance or minimization measures are violated and will notify the project proponent's environmental representative immediately.
7. All project vehicles will be confined to designated project roads or to prominently staked or flagged access routes that are surveyed before use. Designated access routes will be determined by the designated biologists or their representative biological monitors. Vehicle travel will not be permitted off designated transportation routes, except in emergencies or as permitted by the designated biologist. All observed special status species and their habitat features, such as dens, burrows, and specific habitats, will be flagged to alert project personnel to their presence. All project-related flagging will be collected and removed after construction. A daytime speed limit of 15 miles per hour and a nighttime speed limit of 10 mph will be adhered to on the site, and project personnel will not exceed 25 mph on public roads immediately adjacent to the project site, unless maintaining such speed would present a safety concern.
8. Designated biologists will keep an accurate tally of the sensitive resources listed above that are damaged or otherwise affected by project activities. Additionally, the biologists will count the number of small mammal burrows damaged or otherwise affected. This number will be reported in the post-activity compliance report and entered into a central database developed expressly for that purpose.

9. PVS will appoint a company representative as the contact for any employee or contractor who inadvertently kills or injures a special status species or who finds a dead, injured, or entrapped special status species. The representative will be identified during the pre-performance educational briefing. The name and contact information of this representative will be provided to the Service. Contractors, employees, and other personnel who inadvertently kill or injure a special status species will immediately report the incident to their representative. The representative will contact the project proponent's environmental representative and designated biologists. This person will then contact the Service immediately in the case of a dead, injured, or entrapped listed species. The designated biologist will also document all circumstances of death, injury, or entrapment and will take all reasonable steps to enable the animal to escape should it be entrapped, contact the Service to identify an approved rehabilitation center and appropriate capture and transport techniques should the animal be injured, and document circumstances of death in writing and if possible photograph the dead animal in situ before moving it (the animal would be moved only with permission from the applicable agencies).
10. If a special status species is injured or killed by project-related activities, the designated biologist will document the information reported. The Applicant will send the Service a written report within 2 calendar days of learning about the injury or death. It will include the date, time, and location of the finding or incident; location of the carcass; and, if possible, a photograph and any other pertinent information (Ventura Fish and Wildlife Office, 2493 Portola Road, Suite B, Ventura, CA 93003).
11. To prevent inadvertent entrapment of special status species, all excavated, steep-walled holes or trenches more than 2 feet deep (or of any depth if they contain water or other material) will be covered with plywood or other barrier materials. Alternatively, holes or trenches will include one or more escape ramps constructed of earth fill or wooden planks no less than 10 inches wide and reaching to bottom of trench at the close of each working day. Before holes or trenches are filled, a biologist will inspect them for trapped animals. If any worker discovers that special status species have become trapped, construction activities will cease in the vicinity and the designated biologist or representative will be notified immediately. Project workers and the biologist will allow the special status species to escape unimpeded, or the biologists will determine that activities be allowed to continue. If an injured special status species is discovered at any time, the designated representative will contact the Service for guidance.
12. The Applicant will limit pile driving activities to reduce noise levels by completing pile driving using sonic or vibratory pile drivers at reduced driving force instead of impact pile drivers, except in areas where pile driving is the only means of ground penetration, such as encountering hard pan layers or bed rock, and arranging multiple pile drivers so that no two are driving simultaneously within 160 feet of each other.
13. PVS will develop a spill prevention control plan. This plan will detail all actions to be taken in the case of a spill. All hazardous materials spills will be cleaned up

immediately, in accordance with the spill prevention control plan. PVS will provide to the Service a copy of this plan prior to the start of project activities.

14. PVS and its contractors will prohibit pets at the project site, with the exception of working dogs assisting ranchers. Any working dog handler entering the site will be required to provide proof of the animal's inoculations to prevent disease transmission.
15. PVS and its contractors will prohibit firearms within the proposed project footprint.
16. All food-related trash, such as wrappers, cans, bottles, bags, and food scraps, will be disposed of daily in containers with secure covers and regularly removed from the site.
17. Use of rodenticides and herbicides in project areas will be restricted, within the prescriptions of the noxious weed and invasive plant control plan. Herbicides will be applied in accordance with Federal and State regulations. They will be applied only by licensed applicators in accordance with label directions and other restrictions mandated by State and Federal legislation.
18. The width of vehicles in occupied special status species habitat will be limited to 25 feet.
19. On completion of any section, all areas that are significantly disturbed and not necessary for future operations will be stabilized to resist erosion, will be revegetated and recontoured if necessary, and will follow goals and methods in the habitat restoration and revegetation plan to promote restoration of the area to pre-project conditions.

In addition to the 19 General Applicant Proposed Avoidance and Minimization Measures, listed above, the Applicant and PG&E will implement the following minimization and avoidance measures for the telecommunication and powerline upgrades:

1. Development of new access and right-of-way (ROW) roads will be minimized, and clearing vegetation and blading for temporary vehicle access will be avoided.
2. During fire "red flag" conditions, as determined by CAL FIRE, welding will be curtailed, each fuel truck will carry a large fire extinguisher with a minimum rating of 40 B:C, and all equipment parking and storage areas will be cleared of all flammable materials.
3. Personnel will avoid burrows occupied or potentially occupied by federally listed species identified by a designated biologist. Irregular occurrences may arise when this avoidance is not possible. In these cases:
  - a. If occupied or potentially occupied burrows cannot be avoided, a designated biologist will stake and flag a work-exclusion zone and remain on-site as a biological monitor, or the biologist will stake and flag a work exclusion zone around active burrows prior to covered activities at the job site.

- b. If work must proceed in the exclusion zone, crews will implement techniques to minimize direct mortality, including using designated biologists to trap and hold the species in captivity, and excavating and closing burrows. The designated biologist will hold a permit, pursuant to section 10(a)(1)(A) of the Act, for the species. The approved biologist will release the mammals as soon as possible when the work is complete.
4. If San Joaquin kit fox dens are present, their disturbance and destruction will be avoided where possible. However, if dens are located within the proposed work area and cannot be avoided during construction, designated biologists will determine if the dens are occupied. If unoccupied, the designated biologist will remove these dens by hand excavating them in accordance with Service procedures (Service 1999). The exclusion zones for occupied dens will follow current standards or will be determined on a case-by-case basis in coordination with Service and CDFW.
5. If activities take place in blunt-nosed leopard lizard habitat, a designated biologist will determine if burrows are present and if work can avoid burrows. If work cannot avoid the burrows, a designated biologist will evaluate the site for occupancy and stake and flag an appropriate exclusion zone around the burrows prior to activities at the job site.

### ***Species-Specific Proposed Avoidance and Minimization Measures***

In addition to the general proposed conservation measures described above, the Applicant would implement species-specific conservation measures for giant kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander during construction, operations, and maintenance activities.

#### **Giant Kangaroo Rat**

The Applicant would implement the following avoidance and minimization measures for protection of the giant kangaroo rat (PVS 2014):

*Project Design.* Surveys were conducted to document areas of high giant kangaroo rat occupancy. A total of 212 acres of giant kangaroo rat avoidance areas within the project footprint have been incorporated into the Valley Floor Conservation Lands. These areas were selected due to the large concentrations of active and inactive giant kangaroo rat precincts, presence of high quality habitat, and direct connectivity to protected lands including a 20-foot setback from Little Panoche Road, based on the number of giant kangaroo rat active and inactive precincts identified along the adjacent fence line. Habitat corridors would conform to contours of natural ecological features and most suitable habitat in the landscape to maintain functionality of the project site for giant kangaroo rats.

*Giant Kangaroo Rat Relocation Plan Summary.* All activities that would result in permanent or temporary ground disturbance would be preceded by a preconstruction survey for giant kangaroo rats conducted by the designated biologist no more than 30 days prior to commencement of ground disturbing activities. If giant kangaroo rat sign is observed in the work area, the area

would be saturated with traps. All giant kangaroo rats would be relocated off-site within 15 miles of the proposed project footprint. Exclusion fencing would be installed to prevent giant kangaroo rats from re-entering the target burrow. The exclusion fencing would be buried deep enough to prevent giant kangaroo rats from digging under, and high enough to prevent them from jumping over. After trapping for 6 consecutive nights or successfully trapping an individual giant kangaroo rat, all burrows would be excavated to ensure no individuals remain. Giant kangaroo rat burrows/precincts would not be disturbed from January through June, which is the recognized breeding/mating season, unless a qualified biologist verifies by video that no young are present in the burrow. Construction would not begin in an area until trapping efforts have ceased, burrow excavation is complete, and no more giant kangaroo rats are expected to use the area, as determined by the designated biologists. The full Giant Kangaroo Rat Relocation Plan is included in the biological assessment (PVS 2014).

### San Joaquin Kit Fox

The following avoidance and minimization measures would be implemented to reduce effects to the San Joaquin kit fox (PVS 2014):

*San Joaquin Kit Fox Den Avoidance.* After pre-ground disturbance surveys, the designated biologists would identify and clearly mark the areas where San Joaquin kit foxes were identified, along with their dens and burrows. All known or occupied San Joaquin kit fox dens would be identified by flagging a 100-foot buffer. All known San Joaquin kit fox natal dens would be identified by flagging and a 150-foot buffer; all occupied San Joaquin kit fox natal dens would be identified by flagging and a 200-foot buffer. No work activities that would result in effects to the den or occupants would occur within the buffers until it is determined to be unoccupied by the designated biologist. If a road is to be constructed adjacent to a den buffer, a speed limit of 10 mph would be implemented and the den would be monitored for disturbance by a designated biologist. Any potential kit fox dens that cannot be avoided may be excavated and backfilled in accordance with Service (2011a) guidelines without prior notification, provided that excavation is approved and supervised by a biological monitor or other designated biologist. If avoidance of known dens is not possible, the project proponent would take the following sequential steps when working in such areas:

1. Allow for 3 consecutive days of monitoring to determine the occupancy status of each den. Activity at the den will be monitored by using tracking medium at the entrance or stationary infrared beam cameras and by spotlighting. If no activity is observed, actions described below under Step 3 may be implemented. If San Joaquin kit fox activity is observed, the den will be monitored for an additional 5 days from the date of observance. Repeated use of the den during this time will be discouraged by partially plugging its entrances with soil so that any resident animal can escape easily. If San Joaquin kit fox are still using the den after 5 days, den excavation, discussed below under Step 3, may proceed when, in the judgment of the biologist, it is determined to be vacant (San Joaquin kit fox not present at the time).

2. Once the San Joaquin kit fox has vacated the den, methods such as one-way doors will be taken to prevent reentry until construction is complete in these areas. At that point, access to the burrows will be restored.
3. Once it has been confirmed that the dens have been vacated, if construction related impacts will crush or destroy a den, it will be excavated by hand under the supervision of a biologist; no more than 4 inches will be removed at a time. If at any time during excavation a San Joaquin kit fox is discovered inside the den, all activity will cease immediately, and monitoring described above under Step 1 will resume. As indicated above, natal dens will not be disturbed at any time.

*Measures during Construction.* Construction materials would not be stacked in a manner that allows San Joaquin kit fox to establish den sites. Construction items such as solar panels and equipment transported to the project site on pallets would be placed directly on the ground, and the pallets would be removed from the site. High visibility signs would be posted at the boundary of the project site along Little Panoche Road to alert drivers both to construction traffic and to the presence of special status species. The signs would include a posted speed limit. The designated biologist or biological monitors would trap and radio collar San Joaquin kit foxes for location monitoring during construction. The daily telemetry location of the collared San Joaquin kit fox would inform construction personnel of San Joaquin kit foxes in the area and locations to avoid and minimize effects to the species.

*Project Design.* San Joaquin kit fox permeable perimeter fencing would be constructed to allow movement through the proposed project footprint. A 5- to 6-inch gap along the bottom of the chain-link fence would allow San Joaquin kit foxes to travel through the site to existing travel corridors, including the creek washes and the Valley Floor Conservation Lands. It would also allow a link to prey base areas, such as the giant kangaroo rat precinct/colony avoidance areas. A fencing option to the chain-link fence would be an inverted “deer fence” that would have larger rectangular openings on the bottom to allow kit foxes to pass through. Fences surrounding the substation and O&M building would be constructed to restrict San Joaquin kit fox access.

Movement corridors through the site would be protected with little disturbance to the existing habitat. The exceptions would be the existing road, emergency access crossing, and the planned project perimeter road, during project construction and operations and maintenance. Measures added to the project description to provide the San Joaquin kit fox with additional movement corridors through the project include:

1. An approximately 1,640-foot-wide by 8,000-foot-long corridor associated with the Las Aguilas Creek/Valley Floor Conservation Lands corridor will be protected and is expected to be beneficial in providing additional undisturbed connectivity. The corridor would promote movement through the site and north to the Panoche Hills and BLM landholdings. The undisturbed Valley Floor Conservation Lands along Las Aguilas Creek will be widened to accommodate this San Joaquin kit fox enhancement.

2. The Panoche Creek Corridor intersects the southern portion of the Valley Floor Conservation Lands in a west to southeast direction. This corridor provides connectivity to the large block and high quality habitats to the west of the project, including the Gabilan Range and eventually through to the Silver Creek Ranch Conservation Lands and the BLM lands beyond. The southern portion of the Valley Floor Conservation Lands also provides unimpeded west to east travel ways from the Panoche Creek wash (and adjacent flats) to the Valadeao Ranch Conservation Lands and adjacent Tumey Hills/Panoche Hills BLM landholdings, including the Las Aguilas Creek drainage.
3. The Moss-Panoche 230kV Transmission Line Corridor bisects the southwestern portion of the proposed project footprint and associated Valley Floor Conservation Lands in a northwest to southeast direction. This 75-foot corridor provides connectivity to the habitats (e.g., grassland flats and Panoche Creek wash) to the west of the project, including the Gabilan Range, and eventually through to Silver Creek Ranch Conservation Lands and adjacent BLM landholdings.

#### Blunt-Nosed Leopard Lizard

The Applicant would implement the following avoidance and minimization measures to reduce effects to the blunt-nosed leopard lizard (PVS 2014):

*Blunt-nosed Leopard Lizard Surveys.* In the areas closer to previous observations, such as in the vicinity of Las Aguilas Creek, enhanced preconstruction surveys for adult blunt-nosed leopard lizards would be conducted. These enhanced surveys would consist of focused protocol-level blunt-nosed leopard lizard surveys during the adult breeding season preceding the ground disturbance. The survey method would be based on the CDFW Approved Survey Methodology for the Blunt-Nosed Leopard Lizard (CDFW 2004). All observed blunt-nosed leopard lizards would be avoided by a flagged 52.4-acre buffer to alert project personnel to their presence. Motorized vehicles would be prohibited within the 52.4-acre buffer surrounding all blunt-nosed leopard lizard observations, except where those buffers intersect an existing road. If a blunt-nosed leopard lizard is observed on the proposed project footprint, the Service would be contacted.

*Blunt-nosed Leopard Lizard Avoidance during Construction.* Biological monitors would accompany vehicles and crews throughout the project area if the designated biologist considers it necessary in order to avoid individual blunt-nosed leopard lizards. Biological monitors would be given the authority and obligation to order cessation of activities as follows: if an immediate threat of take is identified, if take avoidance or minimization measures are violated, or if a blunt-nosed leopard lizard is located in the construction area. The biological monitor would notify the project environmental representative of a stop work order.

### California Tiger Salamander

The Applicant would implement the following avoidance and minimization measures to reduce effects to the California tiger salamander (PVS 2014):

*California Tiger Salamander Surveys.* The designated biologists or their representatives would survey the work site before the project proponent begins any ground-disturbing activities. If the designated biologists find any adults, eggs, or larvae of California tiger salamander they would relocate them to suitable habitat that is being preserved. The designated biologists would hold the appropriate Federal and State permits, including State scientific collecting permits (SCPs), for amphibians so they could capture and handle the salamanders. The designated biologists may be assisted by approved biologists who do not have SCP; these biologists would be identified as designated monitors.

*California Tiger Salamander Exclusion Fencing.* At the discretion of the designated biologist California tiger salamander exclusion fencing will be installed in construction areas within 1.2 miles of potential or known California tiger salamander breeding sites. These areas would be fenced before the rainy season and before construction begins. Before the exclusion fencing is installed, a preconstruction survey would be conducted by a designated biologist or representative. The project proponent would maintain the California tiger salamander exclusion fencing throughout the rainy season during all construction activities. The project proponent would use wildlife fencing equipped with one-way exits every 250 to 500 feet to avoid entrapping amphibians inside the fence. The project proponent would bury fencing to a depth of 6 inches, and fencing would be a minimum of 30 inches above grade. California tiger salamander exclusion fencing would be designed to exclude other species as well.

Entrances to construction areas would be minimized and would be equipped with a gate that could be closed after each working day. This would prevent California tiger salamanders from entering the site. The project proponent would avoid damaging or destroying small mammal burrows during the installation of the exclusion fencing. The exclusion fencing would be removed after construction or at the end of the rainy season for construction within 1.2 miles of a known or potential breeding pond.

*California Tiger Salamander Relocation Plan.* If a California tiger salamander is observed, the designated biologist(s) would capture it and place it in a suitable bucket or insulated cooler in the shade with a wetted sponge and an ice pack wrapped in a clean cloth (if required) to mimic subterranean conditions. The biologist would record his or her name and the date, time, and California tiger salamander location using a handheld GPS and digital camera. The sex, age, condition, diagnostic markings, and general condition and health would also be recorded and the salamander would be photographed. The salamander would be released into a suitable burrow as close to a suitable pond as possible, most likely on the Valadeao Ranch or Valley Floor Conservation Lands, as quickly as possible. The salamander's time out of the ground would not exceed 1 hour. If a dead or injured California tiger salamander is located during the burrow excavations or construction, the Service would be contacted immediately. The project proponent and designated biologists would follow direction from the Service for the next steps to take. Finally, the actions undertaken and the habitat description and location of the California tiger

salamander would also be recorded and photographed. All of the above information and any field notes would be submitted to the Service. In addition, this information would be recorded in a California Natural Diversity Database (CNDDB) report and the report would be submitted to the CDFW.

*California Tiger Salamander in Project Footprint.* If a California tiger salamander is found by any person in areas that would be impacted by the proposed project, the project proponent would immediately stop all work that could harm the salamander until the permitted designated biologists can capture and relocate it to an appropriate burrow, in accordance with the approved relocation plan. Before surface disturbance or other covered activity, a designated wildlife biologist would conduct a tailgate briefing for all project personnel. This would include an explanation of how to identify California tiger salamander and applicable reporting procedures.

*Open Trenches.* All open holes, sumps, and trenches within the project area would be inspected at the beginning and end of each day during the rainy season for trapped animals. The project proponent would provide earthen or wood escape ramps at least 10-inch-wide of no more than 3:1 slope every 250 to 500 feet.

*Rain Forecast.* The designated biologists or their representative would monitor the National Weather Service 72-hour forecast for the project area. Additionally, a rain gauge installed at the project site would be monitored and refreshed every morning. If rain exceeds 0.25 inch during a 24-hour period, the project proponent would cease work within 1.2 miles of potential or known breeding ponds until no further rain is forecast. This includes stopping construction-related traffic moving through areas, except on public roads. In areas within 1.2 miles of potential or known breeding ponds that have been encircled with California tiger salamander exclusion fencing or if existing burrows have been excavated in compliance with the Project's California tiger salamander Pre-construction Avoidance and Minimization Plan, construction would be allowed to continue during rainstorms. This includes structures to permit one-way movement of California tiger salamander off the work site. During periods of rain, no work would be conducted at night, even within the exclusion fencing, unless there is an imminent threat to life, necessary special status species work, or a significant property or construction interest. PVS would restrict night work in areas within 1.2 miles of potential or known California tiger salamander breeding sites when a 70 percent or greater chance of rainfall is predicted within 48 hours. This would apply to project areas that have not been encircled with exclusion fencing or where burrows have not been excavated until the chance of rain decreases below this threshold. However, even after exclusion fencing is installed or burrows excavated, this condition still applies to construction-related traffic moving through areas within 1.2 miles of potential or known salamander breeding sites but outside of the exclusion fencing (e.g., on roads). If work must be completed at night in the rain and within the exclusion fencing, it would be due to such things as an imminent threat to safety or necessary special status species work.

*Soil Stockpiles.* The project proponent would ensure that soil stockpiles are placed where soil would not pass into potential California tiger salamander breeding pools or into any other Waters of the State, in accordance with Fish and Game Code 5650. The project proponent would appropriately protect stockpiles to prevent soil erosion.

*Barriers to California Tiger Salamander Movement.* Any roadways that the project proponent needs to construct within 1.2 miles of known or potential California tiger salamander breeding sites would be constructed without steep curbs, berms, or dikes, which could prevent California tiger salamander from exiting the roadway. If curbs are necessary for safety or surface runoff, the project proponent would design and construct them to allow California tiger salamanders to walk over them. If steep dikes are required, the project proponent would design and construct them to include over-side drains or curb/dike breaks spaced at intervals of 25 feet to allow California tiger salamander passage.

*Fieldwork Code of Practice.* To ensure that disease is not conveyed between work sites, all biologists would follow the Declining Amphibian Populations Task Force Fieldwork Code of Practice. The designated biologists may substitute a bleach solution of 0.5 to 1 cup of bleach to 1 gallon of water for the ethanol solution. Care will be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.

*Breeding Ponds.* Three potential breeding ponds would be created on conservation lands. The purpose of the pond creation is to create new breeding habitat on the conservation lands, which would be preserved and managed in perpetuity. Through coordination with the Service and CDFW, adaptive management would be used to ensure the success of the created ponds.

### ***Conservation Lands***

The three primary conservation lands (Valley Floor, Valadeao Ranch, and Silver Creek Ranch) would be preserved and managed for the benefit of special status species. These conservation lands would include corridors between the conservation lands to provide connectivity. The following measures would be implemented to protect and enhance all conservation lands.

The perimeter of the conservation lands would be fenced to exclude unauthorized access, where appropriate. If new fencing is installed, fencing would be designed with at least three-strand barbed wire, with a fourth (bottom) strand of smooth wire at least 8 inches above the ground or other fence design approved by the Service. This fencing design would reduce potential injury to wildlife while clarifying conservation land boundaries to the public. Signs would be placed on boundary fencing adjacent to public roads or property accessible by the public at 150-500 foot intervals, indicating that entry without access permission is prohibited, and the lands are protected.

Litter and illegally dumped wastes as prescribed in the Habitat Management Plan would be removed from the property within the first year of establishing the conservation easement, and at least on an annual basis thereafter as needed. The conservation easement will be recorded on all the proposed conservation lands prior to the start of project construction. The initial cleanup areas would include at least the sites identified in the Habitat Management Plan.

Any areas where human disturbance already exists that are not needed for long term maintenance, landowner/lessee access, grazing activities, etc. would be restored in such a way as to blend the area into the surrounding habitat. A revegetation specialist with experience restoring western San Joaquin Valley plant communities would assess individual sites to

determine restoration methods and appropriate planting procedures and species. If restoration is determined to be warranted, methods would follow the Habitat Restoration and Revegetation Plan to be developed for the site.

Actions that facilitate regional connectivity for the special status species through enhancement of corridors and connected portions of the conservation lands would be implemented.

Implementation would include: a) habitat enhancement and restoration within the conservation lands, and b) maintain movement corridors to the connected conservation lands and adjacent protected properties.

In addition to the avoidance and minimization measures described above, the project proponent would implement a habitat management plan. This would consist of the permanent preservation and management of three large parcels of land to offset potential impacts. These lands—Valley Floor Conservation Lands, Valadeao Ranch Conservation Lands, and Silver Creek Ranch Conservation Lands—would be enhanced and managed for the species through implementation of the habitat management plan. A goal of the habitat management plan is to provide a sufficient population level of special status species to offset the effects of construction of the project. The entire habitat management plan is attached as Appendix F to the biological assessment (PVS 2014).

The project includes the preservation and management of approximately 24,176 acres of conservation lands. The conservation lands would be preserved in perpetuity with endowments to the Center for Natural Lands Management. The conservation easement will be recorded and the nonwasting endowment for all management activities will be funded prior to initiation of project construction. Details of the habitat management plan are included in the biological assessment (PVS 2015).

## ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

### **Jeopardy Determination**

Section 7(a)(2) of the Endangered Species Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. “Jeopardize the continued existence of” means “to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species” (50 CFR 402.02).

The jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, which describes the range-wide condition of giant kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander, the factors responsible for that condition, and the species’ survival and recovery needs; (2) the Environmental Baseline, which analyzes the condition of the giant kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the giant kangaroo rat, San

Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander; (3) the Effects of the Action, which identifies the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the giant kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander; and (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities, that are reasonably certain to occur in the action area, on the giant kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of the giant kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of the giant kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander in the wild by reducing the reproduction, numbers, or distribution of that species.

## STATUS OF THE SPECIES

### **Giant kangaroo rat**

The giant kangaroo rat was federally listed as endangered on January 5, 1987 (52FR283) and was listed by the State of California as endangered on October 2, 1980. The Recovery Plan for Upland Species of the San Joaquin Valley (Service 1998) includes the giant kangaroo rat. The giant kangaroo rat was distributed historically from southern Merced County, south through the San Joaquin Valley, to southwestern Kern County and northern Santa Barbara County. Significant populations survive only in a few areas of remaining habitat, including the Panoche Hills, Cuyama Valley, Carrizo and Elkhorn Plains, and the Lokern area.

The giant kangaroo rat is the largest of more than 20 species in the genus *Dipodomys*, which is in the family Heteromyidae. This family includes kangaroo rats, kangaroo mice, and pocket mice. Adult giant kangaroo rats weigh from 4.6 to 6.4 ounces. They are 12.2 to 13.7 inches long and adapted for bipedal hopping. The hind limbs are large compared to the size of the forelimbs. The head is large and flattened, and the neck is short. The tail is longer than the length of the head and body combined. The tail has a crest of long hairs, terminating in a large tuft. Large, fur-lined cheek pouches open on each side of the mouth. The pouches extend as deep pockets of skin along the sides of the head.

Giant kangaroo rats are primarily seed eaters, but they also eat green plants and insects. They cache ripening seed heads in small surface pits or large stacks on the surface over their burrow system. After curing for several weeks, seeds are transported to underground larders. Giant kangaroo rats forage on the surface from around sunset to near sunrise, with most activity taking place in the first two hours after dark. Foraging is greatest in the spring as seeds of annual plants ripen. Commonly consumed seeds include peppergrass (*Lepidium* spp.), filaree (*Erodium cicutarium*), Arabian grass (*Schismus arabicus*), and brome grasses (*Bromus* spp.; Williams 1992).

Giant kangaroo rats develop burrow systems with one or more separate openings. There are two types of burrow: a vertical shaft with a circular opening and no dirt apron, and a larger, more horizontally opening shaft, usually wider than high, with a well-worn path leading from the opening.

Historically, and at the time of listing, the giant kangaroo rat was believed to inhabit open, annual grassland communities with few or no shrubs and sandy-loam soils on gentle slopes of less than 10 percent, and in areas receiving 6 to 7 inches of rain per year but free from flooding (Grinnell 1932; Shaw 1934; Hawbecker 1951). However, most remaining populations are on poorer and marginal habitats, including shrub communities on a variety of soil types and on slopes up to 22 percent (Service 2010a). This broader concept of habitat suggests that current populations are found on lands that are less than optimal, now that optimal grassland habitats of historical populations are under cultivation.

Changes in annual rainfall totals are the major natural ecosystem process throughout the range of giant kangaroo habitat (Single et al. 1996). Changes in weather patterns were linked to expansion and declines in giant kangaroo rat populations in the recovery plan (Service 1998). Changes in annual rainfall can affect forage availability (Williams 1992; Williams and Germano 1994), the development of pathogenic toxic molds (Frank 1988; Single et al. 1996; Germano et al. 2001), and the availability of fuels for habitat-altering wildfire (Germano et al. 2001; Sugihara et al. 2006; Warrick 2006).

Until the 1950s, colonies of giant kangaroo rats were spread over hundreds of thousands of acres of continuous habitat in the western San Joaquin Valley, Carrizo Plain, and Cuyama Valley (Grinnell 1932; Shaw 1934; Hawbecker 1944, 1951). In the listing rule, the estimated historical range of the giant kangaroo rat was from 1,300,000 to 2,500,000 acres. In 1992, Williams estimated the historical habitat to be approximately 1,600,000 acres; however, the distribution at that time was limited to approximately 27,450 acres, or less than 2 percent of the species' former distribution.

The decline of giant kangaroo rats is attributed primarily to habitat loss from the conversion of native scrub and grasslands to agriculture (Service 1998). Habitat destruction resulting from the development of small cities and towns along the western edge of the San Joaquin Valley, between Coalinga and Maricopa, have contributed to the endangerment of the giant kangaroo rat. Other collective factors are development of the infrastructure for petroleum and mineral exploration and extraction, roads and highways, energy and communications infrastructures, and agriculturally related industrial developments. Widespread use of rodenticides and rodenticide-treated grain to control ground squirrels and kangaroo rats may also have contributed to the decline of giant kangaroo rats in some areas.

Grazing occurs over the entire range of the giant kangaroo rat. While overgrazing can have negative effects on habitat quality through competition for food and potential precinct<sup>1</sup> collapse, recent long-term grazing studies have reported declines in the number of kangaroo rats (including the giant kangaroo rat) on ungrazed relative to grazed plots during wet years

---

<sup>1</sup> A "precinct" is a colony of burrows in which multiple giant kangaroo rats reside.

(Williams and Germano 1994; Germano et al. 2001; Kelly et al. 2004; Germano et al. 2005). Livestock grazing is thought to control the dense growth of nonnative grasses that threaten giant kangaroo rats during wet years, as these grasses reduce the open character of the landscape. Therefore, while overgrazing may disturb individual giant kangaroo rat precincts, the cessation of grazing may lead to a significant decline in giant kangaroo rat numbers particularly during wet years.

There are no long-term studies of the population trend of giant kangaroo rats in the northern range (i.e., the Ciervo-Panoche region) because of lack of funding (Service 2010a). However, the decline in kangaroo rat abundance and distribution has been well documented in the southern San Joaquin Valley (Single et al. 1996). In the Lokern area, the decline in giant kangaroo rats may have been caused by the combination of an extremely hot fire in spring 1997 that burned approximately 5,800 acres and several years of heavier than normal precipitation. Giant kangaroo rats are especially vulnerable to local extirpation from random environmental events such as fires, flooding, or unpredictable land use changes. This is because of the small, isolated nature of many remaining populations, their lack of genetic diversity, and low dispersal capability.

Continuing threats to giant kangaroo rat habitat are urban and industrial developments, roads, petroleum and mineral exploration and extraction, new energy and water conveyance facilities, and construction, communication, and transportation infrastructure. These activities also increase the threats to the species by reducing and further fragmenting populations. Rodent control programs have also contributed to the species' decline. Habitat degradation due to lack of appropriate management on conservation lands, especially lack of grazing or fire to control density of vegetation (including shrubs), may be an additional threat to giant kangaroo rats (Williams and Germano 1994).

Relatively new threats throughout the species' range are development of large-scale renewable solar energy projects and construction of associated transmission lines (Service 2010a). These projects can impact giant kangaroo rat habitat by altering landscape topography, vegetation, and drainage patterns. Other impacts are from reducing habitat quality by intercepting solar energy that would normally reach the ground, thereby affecting ambient air temperatures through habitat shading and altering soil moisture regimes (Smith 1984; Smith et al. 1987). Moreover, recently proposed solar projects tend to be large contiguous blocks of disturbance in undeveloped habitat lands, ranging from hundreds to several thousand acres. Associated transmission towers impact giant kangaroo rat habitat by construction of roads and ROWs in natural lands, operation and maintenance, and the potential for off-road vehicle operators along maintenance roads to trespass (Service 2010a).

Current populations of the giant kangaroo rat fluctuate widely in response to changing weather patterns (Williams 1992; Service 1998). Since the giant kangaroo rat was listed as endangered, conversion of its habitat has slowed substantially. This is because most tillable land has already been brought into cultivation and there is a lack of water for additional irrigated acres. However, during and following the 1994-1995 winter, biologists noted a decline in abundance of kangaroo rats in the southern San Joaquin Valley; decreased sign of activity and lower than expected trapping results were observed at several dispersed sites. Dramatic declines were noted for

short-nosed (*Dipodomys nitratooides brevinasus*), Tipton (*D. nitratooides nitratooides*), and Heermann's kangaroo rats (*D. heermanni*), although only modest reductions were noted for giant kangaroo rat populations on the valley floor (Single et al. 1996).

The BLM, in cooperation with species experts, initiated giant kangaroo rat population monitoring studies in the Lokern and Carrizo Plains Natural Areas. Results showed significant declines in giant kangaroo rat numbers in response to both drought and above average rainfall conditions and overall wide and drastic population fluctuations over time.

In 1995, the most recent year in which substantial information is available, the Service concluded that the giant kangaroo rat was present in only a few remaining isolated populations: Cuyama Valley, San Juan Creek Valley, and the Carrizo Plain in San Luis Obispo County; the Panoche Hills on the Fresno-San Benito County line; in the Kettleman Hills of Kings County; and in western Kern County (Service 1998).

From 1980 to 1985, the population of the giant kangaroo rats in the northern range was estimated at only 2,000 over 709 acres (2.8 individuals per acre; Williams 1992). Beginning in summer 1991, at the end of a 5-year drought, the population of the giant kangaroo rat increased dramatically. From 1992 to 1993, the population in the northern range was estimated to be 37,125 over an area of 4,653 acres (8.0 individuals per acre; Williams et al. 1995). More recently, Loew et al. (2005) estimated the population of the giant kangaroo rat in the northern range to be approximately 12,375, based on burrow and food-cache counts, as well as mark-recapture methods. The authors further estimated the subpopulations of the giant kangaroo rat within the northern range to be approximately 80 in the Ciervo Hills, 1,194 in Tumey Hills, 5,480 in Monocline Ridge, and 5,621 in the Panoche Valley.

Approximately 95,000 acres of giant kangaroo habitat remain in the Ciervo-Panoche Natural Area (Service 2010a). Of this, only approximately 16,048 acres (17 percent) of habitat has been protected from incompatible uses, primarily through the establishment of BLM Areas of Critical Environmental Concern (ACECs) and private land easements. We do not know how much of this protected habitat is occupied by giant kangaroo rat (Service 2010a). Most of the Panoche Valley area is in private ownership and is considered the primary source of regional expansion of the giant kangaroo rat in the northern range (Good et al. 1997; Loew et al. 2005).

In their research on genetic structure and diversity of giant kangaroo rat populations in the northern range, Good et al. (1997) and Loew et al. (2005) found that while genetic diversity remains high between subpopulations, the topographic complexity, isolation, and small size of the subpopulations has reduced the amount of within-group genetic diversity. Low within-group diversity increases the risk that random events such as disease or fire may eliminate subpopulations (Service 2010a); this would in turn lower the overall diversity of the northern population of giant kangaroo rat (Good et al. 1997; Loew et al. 2005).

Evidence of connectivity between northern subpopulations has been found, including between the Panoche Valley and Ciervo and Tumey Hills subpopulations (Good et al. 1997; Loew 2005). Dispersal is primarily by long-distance migrants or "stepping-stone" subpopulations. Loew et al. (2005) noted the importance of Panoche Creek as a dispersal corridor between the Monocline

Ridge and Tumey Hills subpopulations. Loew et al. (2005) also suggest that habitat along Silver Creek could be managed as another dispersal corridor in the region. In general, these studies highlight the importance of small stepping-stone populations and dispersal corridors, such as Panoche Creek and Silver Creek, to the continued genetic health of the northern population of giant kangaroo rats.

The range of this species has increased by 40 percent on the Carrizo and Elkhorn Plains since 2001. In addition, surveys of active precincts in the Cuyama Valley show that since 2001 the range of giant kangaroo rat there has doubled. The status of giant kangaroo rat in the San Juan Creek Valley and in Kettleman Hills has yet to be monitored and therefore remains unknown.

### *Recovery Objectives*

The giant kangaroo rat is included in the Recovery Plan for Upland Species of the San Joaquin Valley, California (Service 1998). According to the plan, giant kangaroo rat populations can be considered recovered when the three largest populations (western Kern County, Carrizo Plain Natural Area, and the Panoche Region) and the populations in the Kettleman Hills, San Juan Creek Valley, and Cuyama Valley are protected and managed appropriately. The principal factor in recovery of giant kangaroo rats is protecting existing habitat and key populations. Population responses to environmental variation seen during the last 16 years (Williams 1992; Williams et al. 1993; Williams and Nelson in press in Service 2011b; Williams unpublished data in Service 2011b) suggest that random catastrophic events (e.g., drought, flooding, and prolonged rainfall) pose the greatest risk to long-term survival of the species. Protection from random catastrophic events requires both relatively large habitat areas with varying topography and habitat conditions and land uses that provide optimum habitat conditions.

However, in its 5-year review of the species' status, the Service showed that the giant kangaroo rat continues to meet the definition of endangered and is in danger of extinction throughout its known range (Service 2010a). This conclusion was reached due to:

- Restriction of giant kangaroo rats to less than five percent of their historical range on highly fragmented, suboptimal habitat;
- Continuation of threats from oil and gas extraction, urban and residential development, and large solar power plants;
- Genetic isolation of populations in the Tumey Hills and Ciervo Hills;
- Lack of protection of the populations in the Panoche Valley; and
- Protection of less than 20 percent of populations in western Kern County.

### **San Joaquin Kit Fox**

The San Joaquin kit fox was listed as an endangered species on March 11, 1967 (Service 1967). The San Joaquin kit fox is the umbrella species for the Recovery Plan for Upland Species of the San Joaquin Valley, California, indicating that measures used for recovery of the species would also benefit other species with overlapping ranges and habitat requirements (Service 1998).

The kit fox is the smallest canid species in North America, and the San Joaquin kit fox is the largest subspecies in skeletal measurements, body size, and weight. Adult males average 31.7 inches in total length, and adult females average 30.3 inches in total length (Grinnell et al. 1937). All kit foxes have long slender legs and are approximately 12 inches high at the shoulder. The average weight of adult males is 5.0 pounds, and the average of adult females is 4.6 pounds (Morrell 1972). General physical characteristics of kit foxes include a small, slim body, relatively large ears set close together, narrow nose, and a long, bushy tail tapering slightly toward the tip. The tail is typically carried low and straight.

Color and texture of the fur coat of all kit foxes varies geographically and seasonally. The most commonly described colorations are buff, tan, grizzled, or yellowish-gray dorsal coats (McGrew 1979). Two distinctive coats develop each year: a tan summer coat and a silver-gray winter coat (Morrell 1972). The ear pinna (external ear flap) is dark on the back side, with a thick border of white hairs on the forward-inner edge and inner base. The tail is distinctly black-tipped.

In the San Joaquin Valley before 1930, the range of the San Joaquin kit fox extended from southern Kern County north to Tracy, San Joaquin County, on the west side, and near La Grange, Stanislaus County, on the east side (Grinnell et al. 1937; Service 1998). Historically, this species occurred in several San Joaquin Valley native plant communities. In the southernmost portion of the range, these communities included Valley Sink Scrub, Valley Saltbush Scrub, Upper Sonoran Subshrub Scrub, and Annual Grassland. San Joaquin kit foxes currently inhabit some areas of suitable habitat on the San Joaquin Valley floor. They can be found in the surrounding foothills of the coastal ranges, Sierra Nevada, and Tehachapi Mountains, from southern Kern County north to Contra Costa, Alameda, and San Joaquin Counties on the west, and near La Grange, Stanislaus County, on the east side of the valley. They also inhabit some of the larger scattered islands of natural land on the valley floor in Kern, Tulare, Kings, Fresno, Madera, and Merced Counties.

The largest extant populations of kit foxes are in western Kern County on and around the Elk Hills and Buena Vista Valley and in the Carrizo Plain Natural Area, San Luis Obispo County. The Ciervo-Panoche core area in eastern San Benito, western Fresno, and southern Merced Counties, while not one of the largest extant populations, includes over 52,000 acres of BLM-administered land that offer some protection to the kit fox. Even so, much of the BLM-administered land in the core area is not suitable for kit fox due to its rugged character and shallow soils. Most suitable kit fox habitat in the core area is on private land in the valley floors (O'Farrell 1981).

Though the central and northern portions of the range have not been continuously monitored, populations were recorded in the late 1980s at San Luis Reservoir, Merced County (Briden et al. 1987); North Grasslands and Kesterson National Wildlife Refuge (NWR) on the valley floor, Merced County (Paveglio and Clifton 1988); and in the Los Vaqueros watershed, Contra Costa County in the early 1990s (Service 1998). Smaller populations are also known from other parts of the San Joaquin Valley floor, including Madera County and eastern Stanislaus County (Williams 1990).

Kit foxes occur at varying densities in the areas between the core populations (e.g., Panoche-Coalinga and Kettleman Hills). These populations provide links between core populations and also probably with smaller, more isolated populations in adjacent valleys (e.g., Panoche Valley) and in the Kreyenhagen Hills and Anticline Ridge around Coalinga and Avenal.

Kit foxes prefer loose-textured soils (Grinnell et al. 1937; Hall 1946; Egoscue 1962; Morrell 1972), but are found on virtually every soil type. Dens appear to be scarce in areas with shallow soils because of the proximity to bedrock (O'Farrell and Gilbertson 1979), high water tables (McCue et al. 1981), or impenetrable hardpan layers (Morrell 1972). However, kit foxes will occupy soils with high clay content where they modify burrows dug by other animals (Orloff et al. 1986). Sites that may not provide suitable denning habitat may be suitable for feeding or providing cover. Kit fox dens are commonly located on flat terrain or on the lower slopes of hills. Common locations for dens are washes, drainages, and roadside berms. Kit foxes also commonly den in human-made structures, such as culverts and pipes (O'Farrell 1984; Spiegel and Tom 1996).

In the San Joaquin Valley, optimal habitats for San Joaquin kit foxes generally are those in which conditions are more desert-like, such as arid shrublands and grasslands (Service 1998). These areas are characterized by sparse or no shrub cover, sparse ground cover with patches of bare ground, short vegetative structure less than 18 inches tall, and sandy to sandy-loam soils.

Tall or dense vegetation generally is less optimal for foxes (Smith et al. 2005). Such conditions make it difficult for foxes to detect approaching predators or capture prey. Kit foxes also tend to avoid rugged steep terrain; predation risk apparently is higher for foxes under such topographic conditions (Warrick and Cypher 1998). In general, flat terrain or slopes less than 5 percent are optimal, slopes of 5 to 15 percent are suitable, and slopes greater than 15 percent are unsuitable. For this reason, the foothills of the Coast Ranges generally are considered to demark the western boundary for suitable kit fox habitat.

Ground disturbance from tilling, maintenance, and harvesting is frequent and can destroy dens. Also, most agricultural lands in the San Joaquin Valley are irrigated, which can flood and collapse dens. Agricultural lands also are subject to intensive chemical applications, including fertilizers, pesticides, defoliants, and weed suppression; these practices can result in a lack of prey availability for kit foxes. Use of rodenticides is common in some agricultural environments and is particularly problematic for kit foxes due to the potential for secondary poisoning.

San Joaquin kit foxes appear to be strongly linked ecologically to kangaroo rats. San Joaquin kit foxes are especially well adapted for preying on kangaroo rats, and consequently, San Joaquin kit fox abundance and population stability are highest in areas where kangaroo rats are abundant (Service 1998; Cypher 2003).

The diet of the San Joaquin kit fox varies geographically, seasonally, and annually, based on temporal and spatial variation in abundance of potential prey. Kangaroo rats, pocket mice, white-footed mice, and other nocturnal rodents can comprise about one-third or more of their diets. Kit foxes are also known to prey on California ground squirrels, black-tailed hares, San

Joaquin antelope squirrels, desert cottontails, ground-nesting birds, and insects (Scrivner et al. 1987a).

Adult San Joaquin kit foxes are typically solitary during late summer and fall. In September and October, adult females begin to excavate and enlarge natal dens (Morrell 1972). Pups are born between February and late March (Egoscue 1962; Morrell 1972). Mean litter sizes reported for San Joaquin kit fox range from 2.0 to 3.8 individuals at the Naval Petroleum Reserve (White and Ralls 1993; Spencer et al. 1992; Spiegel and Tom 1996; Cypher et al. 2000). Pups appear above ground at about age 3 to 4 weeks, and are weaned at age 6 to 8 weeks.

Estimates of fox density vary greatly throughout its range and have been reported as high as 1.2 animals per square kilometer in optimal habitats in good years (Service 1998). At the Elk Hills in Kern County, density estimates varied from 0.3 animal per square mile in the early 1980s to 0.004 animal per square mile in 1991 (Service 1998). Kit fox home ranges vary in size are generally approximately 1.0 square mile (Knapp 1979; Spiegel and Tom 1996; Service 1998). Individual home ranges overlap considerably, at least outside the core activity areas (Morrell 1972; Spiegel 1996).

Although most young kit foxes disperse less than 8 kilometers (Scrivner et al. 1987b), dispersal distances of up to 75 miles have been documented for the San Joaquin kit fox (Scrivner et al. 1993; Service 1998). Dispersal can be through disturbed habitats, such as agricultural fields, and across highways and aqueducts. The age at dispersal ranges from 4 to 32 months (Cypher 2003). Among juvenile kit foxes surviving to July 1 at the Naval Petroleum Reserve, 49 percent of the males dispersed from natal home ranges while 24 percent of the females dispersed (Koopman et al. 2000). Among dispersing kit foxes, 87 percent did so during their first year. Some kit foxes delay dispersal and may inherit their natal home range.

San Joaquin kit foxes are primarily nocturnal, although individuals (mostly pups) are occasionally observed resting or playing near their dens during the day (Grinnell et al. 1937). A mated pair of kit foxes and their current litter of pups usually occupy each home range. Other adults, usually offspring from previous litters, also may be present (Koopman et al. 2000), but individuals often move independently within their home range (Cypher 2003). Average distances traveled each night range from 5.8 to 9.1 miles and are greatest during the breeding season (Cypher 2003).

Kit foxes maintain core home range areas that are exclusive to mated pairs and their offspring (White and Ralls 1993; Spiegel 1996; White and Garrott 1997). This territorial spacing behavior eventually limits the number of foxes that can inhabit an area, owing to shortages of available space and per capita prey. Hence, as habitat is fragmented or destroyed, the carrying capacity of an area is reduced and a larger proportion of the population is forced to disperse. Increased dispersal generally leads to lower survival rates and, in turn, decreased abundance. This is because greater than 65 percent of dispersing juvenile foxes die within 10 days of leaving their natal range (Koopman et al. 2000).

The distribution and abundance of the San Joaquin kit fox has decreased since its listing in 1967. This trend is almost certain to continue into the foreseeable future unless measures are

implemented to protect, sustain, and restore suitable habitats and alleviate other threats to their survival and recovery.

Less than 20 percent of the habitat in the historical range of the San Joaquin kit fox remained when the subspecies was listed as endangered in 1967, and there has been a substantial net loss of habitat since that time. Historically, San Joaquin kit foxes occurred throughout California's Central Valley and adjacent foothills. Extensive land conversions in the Central Valley began as early as the mid-1800s. By the 1930s, the range of the kit fox had been reduced to the southern and western parts of the San Joaquin Valley (Grinnell et al. 1937). The primary factor contributing to this restricted distribution was the conversion of native habitat to irrigated cropland, industrial uses (e.g., hydrocarbon extraction), and urbanization (Laughrin 1970; Jensen 1972; Morrell 1972; 1975). Approximately half the natural communities in the San Joaquin Valley were tilled or developed by 1958 (Service 1980).

This rate of loss accelerated following the completion of the Central Valley Project and the State Water Project, which diverted and imported new water supplies for irrigated agriculture (Service 1995). From 1959 to 1969 alone, an estimated 34 percent of natural lands were lost within the then-known kit fox range (Laughrin 1970). Most of the documented loss of habitat has been the result of conversion to irrigated agriculture.

The conversion of natural lands to agriculture continues to be a threat on private lands on the western side of the San Joaquin Valley floor; here agriculture has been extended west to the base of the foothills since the 1960s (Kelly et al. 2005). Large blocks of suitable habitat that support kit fox do remain in the Panoche and Pleasant Valleys in the foothills slightly to the west of the San Joaquin Valley (Cypher et al. 2007). However, including both these areas and the western uplands of Fresno County, there were only 5,559 acres of suitable habitat and 20,543 acres of less than optimal habitat remaining by 2007 (Cypher et al. 2007).

Land conversions contribute to declines in kit fox abundance through direct and indirect mortalities, displacement, prey population and denning site reduction, changes in the distribution and abundance of larger canids that compete with kit foxes for resources, and carrying capacity reductions.

Extensive habitat destruction and fragmentation have contributed to smaller, more isolated populations of kit foxes. Small populations have a higher probability of extinction than large populations because their low abundance renders them susceptible to random events, such as high variability in age and sex ratios, and catastrophes, such as floods, droughts, and disease epidemics (Lande 1988; Frankham and Ralls 1998; Saccheri et al. 1998). Similarly, isolated populations are more susceptible to extirpation by accidental or natural catastrophes because the likelihood of recolonization has been diminished.

These stochastic events can adversely affect small, isolated populations with devastating results. Extirpation can even occur when the members of a small population are healthy, because whether the population increases or decreases in size depends less on the age-specific probabilities of survival and reproduction than on chance. Owing to the probabilistic nature of

extinction, many small populations will eventually go extinct when faced with these random risks (Caughley and Gunn 1996).

Vehicles appear to be the primary cause of mortality for urban kit foxes, and most strikes occur on arterial roads, which have higher traffic volumes and speed limits (Bjurlin et al. 2005; Cypher et al. 2005). Two-lane roads may not be as dangerous for kit foxes as are major arterial roads (Cypher et al. 2005). Kit foxes are more frequently struck near intersections between major roads and other linear rights-of-way, such as railroads, canals, and other roads. These most likely function as movement corridors for kit foxes, and the foxes do not appear to avoid roads for denning sites (Bjurlin et al. 2005).

The diets and habitats selected by coyotes (*Canis latrans*) and kit foxes living in the same areas are often quite similar (Cypher and Spencer 1998). Hence, the potential for resource competition between these species may be quite high when prey resources are scarce, such as during droughts, which are quite common in semiarid central California. Land conversions and associated human activities have led to changes in the distribution and abundance of coyotes, which compete with kit foxes for resources.

Coyotes are the primary cause of mortality for kit foxes in most areas (Cypher et al. 2003). The threat to kit foxes from red foxes (*Vulpes vulpes*) is still being evaluated, but the potential for both interference and exploitative competition is high (Cypher et al. 2001). The red fox is a highly adaptable species, able to persist in agricultural lands; they do not depend on dens for cover, they are highly mobile, which facilitates avoiding dangers and locating food, and they are highly omnivorous. Coyotes occur in most areas with abundant populations of San Joaquin kit foxes. During the past few decades, coyote abundance has increased in many areas owing to a decrease in ranching, favorable landscape changes, and reduced control efforts (Orloff et al. 1986; Cypher and Scrivner 1992; White and Ralls 1993; White et al. 1996). Although coyotes are common in both natural and agricultural landscapes, they pose a greater predation threat to the kit fox on agricultural lands because of the decreased availability or absence of escape dens and vegetative cover (Cypher et al. 2005).

Coyotes may kill San Joaquin kit foxes in an attempt to reduce resource competition. Injuries from coyotes accounted for 50 to 87 percent of the mortalities of radio-collared kit foxes at Camp Roberts, the Carrizo Plain Natural Area, the Lokern Natural Area, and the Naval Petroleum Reserves (Cypher and Scrivner 1992; Standley et al. 1992; Ralls and White 1995; Spiegel 1996).

Some methods of pest and rodent control pose a threat to kit foxes through direct or secondary poisoning, and these threats are often encountered in agricultural settings. Kit foxes may be killed if they ingest rodenticide in a bait application, or if they eat a rodent that has consumed the bait. Even sublethal doses of rodenticides may lead to the death of these animals by impairing their ability to escape predators or find food. Pesticides and rodenticides may also indirectly affect the survival of kit foxes by reducing the abundances of their staple prey species. For example, the California ground squirrel, which is the staple prey of kit foxes in the northern portion of their range and on agricultural lands, was thought to have been eliminated from Contra Costa County in 1975, after extensive rodent eradication programs. Field observations indicated

that the long-term use of ground squirrel poisons in this county severely reduced kit fox abundance through secondary poisoning and the suppression of populations of its staple prey (Orloff et al. 1986).

Historically, kit foxes may have existed in a metapopulation structure of core and satellite populations, some of which periodically experienced local extinctions and recolonization (Service 1998). However, today's populations exist in an environment drastically different from the historical one, and extensive habitat fragmentation has resulted in geographic isolation, smaller population sizes, and reduced genetic exchange among populations. This increases the vulnerability of kit fox populations to extirpation.

Populations of kit foxes are extremely susceptible to the risks associated with small population size and isolation because they are characterized by marked instability in population density. For example, the relative abundance of kit foxes at the Naval Petroleum Reserves, California, decreased ten-fold between 1981 to 1983, increased seven-fold between 1991 to 1994, and then decreased two-fold in 1995 (Cypher and Scrivner 1992; Cypher and Spencer 1998).

The destruction and fragmentation of habitat could also eventually lead to reduced genetic variation in populations of kit foxes that are small and geographically isolated. Genetic assessments indicate that historical gene flow among populations was quite high, and that gene flow between populations is still occurring (Schwartz et al. 2005). Kit fox dispersal likely still maintains genetic variation throughout the range of the kit fox. Disruption of kit fox dispersal abilities through habitat loss, however, could result in an increase in inbreeding and a loss of genetic variation. These factors could increase the extinction risk for small, isolated populations of kit foxes by interacting with demography to reduce fecundity, juvenile survival, and lifespan (Lande 1988; Frankham and Ralls 1998; Saccheri et al. 1998).

### *Recovery Objectives*

The San Joaquin kit fox is included in the Recovery Plan for Upland Species of the San Joaquin Valley, California (Service 1998). The primary goal of the recovery strategy for kit foxes identified in the plan is to establish a complex of interconnected core and satellite populations throughout the species' range. The long-term viability of each of these core and satellite populations depends partly on periodic dispersal and genetic flow between them. Therefore, kit fox movement corridors between these populations must be preserved and maintained.

The Service and cooperating public, nonprofit, and private stakeholders are working to conserve habitat by establishing preserves, conservation banks, and conservation easements. Threats to recovery of San Joaquin kit fox include loss of habitat to agricultural and urban development, effects of pesticide exposure, competitive exclusion by other canids, highly fluctuating population dynamics, isolation and loss of small subpopulations due to random events, habitat fragmentation, vehicle strikes, predation, and loss of prey.

## Blunt-nosed Leopard Lizard

The blunt-nosed leopard lizard was federally listed as endangered on March 11, 1967 (Service 1967). A recovery plan for the blunt-nosed leopard lizard was first prepared in 1980, revised in 1985, and then superseded by the Recovery Plan for Upland Species of the San Joaquin Valley (Service 1998).

The species is a relatively large lizard in the Iguanidae family, with a long regenerative tail, long powerful hind limbs, and a short blunt snout (Smith 1946; Stebbins 1985). Though their under surface is uniformly white, the species exhibits tremendous variation in color and pattern on the back (Montanucci 1965, 1970), ranging from yellowish or light gray-brown to dark brown. Males are typically larger and weigh more than females; adults range in size from 3.4 to 4.7 inches (Tollestrup 1982) and weigh between 0.8 and 1.5 ounces; (Uptain et al. 1985).

The blunt-nosed leopard lizard is endemic to the San Joaquin Valley of Central California (Stejneger 1893; Smith 1946; Montanucci 1965, 1970; Tollestrup 1979a). The species typically inhabits open, sparsely vegetated areas on the San Joaquin Valley floor and surrounding foothills (Smith 1946; Montanucci 1965) in nonnative grassland and valley sink scrub communities (Holland 1986). Other suitable habitat (Holland 1986) includes valley needlegrass (*Nassella* sp.) grassland, alkali playa, and *Atriplex* grassland (Tollestrup 1976).

Blunt-nosed leopard lizards feed primarily on insects (mostly grasshoppers, crickets, and moths) and other lizards, although some plant material is eaten occasionally or, perhaps, unintentionally consumed with animal prey. They appear to feed opportunistically on animals, eating whatever is available in the size range they can overcome and swallow (Service 2010b).

Adult lizards often seek safety in burrows, while immature lizards use rock piles, trash piles, and brush. The lizards use burrows constructed by mammals, such as kangaroo rats, for overwintering and aestivation. Adult lizards hibernate during the colder months of winter and are less active in the hotter months of late summer. Adults are active above ground from about March or April through September. Hatchlings are active until mid-October or November, depending on weather.

Blunt-nosed leopard lizards use small rodent burrows for shelter from predators and temperature extremes (Tollestrup 1979b). Burrows are generally abandoned ground squirrel (*Spermophilus beecheyi*) tunnels or occupied or abandoned kangaroo rat (*Dipodomys* spp.) tunnels (Montanucci 1965). Each lizard will use several burrows but will avoid burrows occupied by other leopard lizards or predators (Service 2010b). In low density burrow areas, lizards can construct shallow, simple tunnels in earth berms or under rocks (Montanucci 1965).

Microhabitat use and home range characteristics of blunt-nosed leopard lizards were compared at two sites that differed in ground cover near Elk Hills in Buena Vista Valley that differed in ground cover (Warrick et al. 1998). The authors reported that blunt-nosed leopard lizard microhabitat use differed significantly between the two study sites. At the more densely vegetated site, blunt-nosed leopard lizards used dry wash areas significantly more than grassland,

floodplain, and road habitats. Conversely, at the more sparsely vegetated site, grassland was used more than wash habitat, and hills were used less than all other habitats.

Home ranges of individual blunt-nosed leopard lizards have been examined in several studies (Tollestrup 1979b; Warrick et al. 1998; and Germano et al. 2004). Early studies estimated home ranges for both male and female individuals at less than 2.4 acres, but subsequent studies by Warrick et al. (1998) found the average male home range to be 10.48 acres and the average female home range size to be 4.99 acres. Female ranges overlapped with up to four males' home ranges but were not observed to overlap with other females' ranges.

Historically, blunt-nosed leopard lizards occurred in arid lands throughout much of the San Joaquin Valley and adjacent foothills. This ranged from San Joaquin County in the north to the Tehachapi Mountains in the south, as well as in the Carrizo Plain and Cuyama Valley (Montanucci 1965; Germano and Williams 1992; McGuire 1996). Lizard habitat has been significantly reduced, degraded, and fragmented by roads, agricultural development, petroleum and mineral extraction, livestock grazing, pesticide application, and off-road vehicle use. Due to the expansion of agriculture and grazing, oil extraction, and urban development, the species is restricted to less than 15 percent of its historical range (Williams and Germano 1992; Jennings 1995). A comprehensive survey of the species' entire historical range has never been completed. Thus, any changes in the range of the species from the time of listing are currently unknown (Service 2010b).

The current known occupied range is in scattered parcels of undeveloped land and margins of developed land on the valley floor and in the foothills of the Coast Range. Blunt-nosed leopard lizards occur from Merced and Madera Counties in the north through Fresno, Kings, Tulare, and Kern Counties to San Luis Obispo, Santa Barbara, and Ventura Counties in the south (Service 1998).

Comprehensive monitoring studies have not been conducted in the Ciervo-Panoche Natural Area or Merced and Madera Counties, in the northern portion of the species' range. However, such studies have been conducted in the southern portion of its range, at Elkhorn Plain (Germano et al. 2004; Germano and Williams 2005), Semitropic Ridge (Warrick 2006), Lokern (Germano et al. 2005; Warrick 2006), Elk Hills (Quad Knopf 2006), Pixley National Wildlife Refuge (NWR; Service 2010c), Buttonwillow Ecological Reserve, Allensworth Ecological Reserve (Service 2010c), and Coles Levee Ecosystem Preserve (Quad Knopf 2005). The studies show that population densities decreased below 5 individuals per acre during the wet years in the late 1990s at Pixley NWR, while the density remains below 5 individual per acre in the Lokern area, the Elk Hills, and Coles Levee Ecosystem Preserve. Population density estimates at Semitropic Ridge Preserve were also well below 4 individuals per acre during spring road surveys in 2005. Elkhorn Plain, however, has been reported to have the highest abundance and density of blunt-nosed leopard lizards recorded in any area, with densities up to 40 adults per acre and 89 hatchlings per acre (Germano and Williams 2005).

Though population density estimates do not exist for the Ciervo-Panoche natural area, where suitable habitat exists in this area, the habitat has been noted as some of the best in the region

(Service 2010b). Although most of this habitat remains on private lands, current land use is compatible with blunt-nosed leopard lizard persistence.

Overall, the blunt-nosed leopard lizard is considered to be decreasing in abundance across its range (Service 2010b). This conclusion is based on population instability and ongoing modification and conversion of existing habitat to agriculture, residential and commercial developments, and petroleum and mineral extraction. Long-term studies conducted on the valley floor and foothill regions of southern San Joaquin Valley show blunt-nosed leopard lizard population instability, especially during years of above-average precipitation (Germano et al. 2004; Germano et al. 2005; Germano and Williams 2005; Service 2010b). The largest and most stable population of blunt-nosed leopard lizards on the valley floor is thought to be at Semitropic Ridge Preserve; however, the number of all lizards there has been decreasing since 2003 for unknown reasons.

At the time the blunt-nosed leopard lizard was listed, the conversion of native habitat to agriculture was considered to be its primary threat. Additional threats to the blunt-nosed leopard lizard were habitat fragmentation, mineral development (primarily for oil and gas extraction), inappropriate grazing levels, and agricultural pest control, primarily spraying for the beet leafhopper (Montanucci 1965). Habitat disturbance, destruction, and fragmentation continue as the greatest threats to blunt-nosed leopard lizard populations. Disturbances and modifications of habitats in areas of urban development, oil and natural gas exploration, and water banking development pose lesser but continuing threats because they degrade the habitat. Direct mortality occurs when animals are killed in their burrows during construction, are killed by vehicle traffic, drown in oil, or fall into excavated areas from which they are unable to escape.

Presently, additional habitat loss can be expected due to ongoing modification and conversion of existing habitat for agriculture, residential and commercial developments, oil and gas exploration, water banking facilities construction, and solar power developments.

The Panoche Valley was identified as an important area for blunt-nosed leopard lizard within the Ciervo-Panoche Natural Area (Service 1998). Panoche and Silver Creeks were identified as important dispersal corridors in the Ciervo-Panoche Natural Area (Service 1998; Loew et al. 2005), but most of these areas remain unprotected and subject to residential and agricultural development.

Livestock overgrazing may negatively affect blunt-nosed leopard lizards by soil compaction, damaging rodent burrows that the lizards depend on for cover, and stripping away vegetative cover used by both the lizard and its prey (Hansen et al. 1994). However, the cessation of grazing is likely to be even more detrimental to blunt-nosed leopard lizard due to the dense growth of exotic grasses (Germano et al. 2001; Germano et al. 2005). Annual grazing studies in the Lokern area from 1997 to 2005 have demonstrated the benefits of livestock grazing in reducing exotic grasses and increasing blunt-nosed leopard lizard numbers (Germano et al. 2005). As of 2015, the BLM office in Hollister, California, is updating its resource management plan (RMP) with respect to grazing in the Ciervo-Panoche area.

### *Recovery Objectives*

A recovery plan for the blunt-nosed leopard lizard was first prepared in 1980, was revised in 1985, and was finally superseded by the Recovery Plan for Upland Species of the San Joaquin Valley, California (Service 1998). According to the recovery plan, substantial habitat for blunt-nosed leopard lizard is already in public ownership or a conservation program; however, appropriate habitat management prescriptions for these parcels are mostly unknown, and no parcels are being managed specifically for this species. Therefore, three important factors in recovering the species are: determining appropriate habitat management prescriptions, protecting additional habitat within the range of the species, and gathering data on population responses to environmental variation throughout the range.

The 5-year review for the species recommended that it remain listed as endangered, based on habitat loss, fragmented populations, and current threats (Service 2010b). According to the five-year review, the downlisting criteria require the protection of 5 or more areas, each at least 5,997 acres in size, including one area in the foothills of the Ciervo-Panoche natural area. In the Ciervo-Panoche Natural Area, two BLM ACECs, separated by 2 miles, protect 4,800 acres and 3,800 acres of contiguous blunt-nosed leopard lizard habitat. Panoche Valley and dispersal corridors in western Fresno County, including Panoche and Silver Creeks, are specifically identified as important actions to facilitate recovery (Service 2010b).

The recovery strategy requires that the Service takes the following actions:

- Determine appropriate habitat management and compatible land uses for the blunt-nosed leopard lizard
- Protect additional habitat for them in key portions of their range
- Gather additional data on population responses to environmental variation at representative sites in their existing geographic range (Service 1998)

### **California Tiger Salamander**

The Service recognizes three distinct populations of the California tiger salamander: one in Sonoma County; one in northern Santa Barbara County; and the one under consideration in this biological opinion in central California. On September 21, 2000, the Service listed the Santa Barbara County distinct population segment of the California tiger salamander as endangered (Service 2000). On March 19, 2003, the Service listed the Sonoma County distinct population segment of the California tiger salamander as endangered (Service 2003). On August 4, 2004, the Service published a final rule listing the California tiger salamander as threatened range-wide, including the previously identified Sonoma and Santa Barbara distinct population segments (Service 2004). On August 19, 2005, U.S. District Judge William Alsup vacated the Service's downlisting of the Sonoma and Santa Barbara populations from endangered to threatened. Thus, the Sonoma and Santa Barbara populations are listed as endangered, and the central California population is listed as threatened.

The central California tiger salamander is endemic to the grassland community found in California's Central Valley, the surrounding foothills, and coastal valleys (Fisher and Shaffer

1996). The distribution of breeding locations of this species, and the other two distinct populations, does not naturally overlap with that of any other species of tiger salamander (Loredo et al. 1996, Petranka 1998, Stebbins 2003).

The California tiger salamander is a large and stocky terrestrial salamander with small eyes and a broad, rounded snout. Adults may reach a total length of 8.2 inches, with males generally averaging about 8 inches total length, and females averaging about 6.8 inches in total length. For both sexes, the average snout-to-vent length is approximately 3.6 inches (Service 2000). The small eyes have black irises and protrude from the head. Coloration consists of white or pale yellow spots or bars on a black background on the back and sides. The belly varies from almost uniform white or pale yellow to a variegated pattern of white or pale yellow and black. Males can be distinguished from females, especially during the breeding season, by their swollen cloacae (a common chamber into which the intestinal, urinary, and reproductive canals discharge), larger tails, and larger overall size (Loredo and Van Vuren 1996).

Historically, natural ephemeral vernal pools were the primary breeding habitats for California tiger salamanders (Twitty 1941, Fisher and Shaffer 1996, Petranka 1998). However, with the conversion and loss of many vernal pools through farmland conversion and urban and suburban development, ephemeral and permanent ponds that have been created for livestock watering are now frequently used by the species (Fisher and Shaffer 1996, Robins and Vollmar 2002).

California tiger salamanders spend the majority of their lives in upland habitats and cannot persist without them (Trenham and Shaffer 2005). The upland component of California tiger salamander habitat typically consists of grassland savannah, but includes grasslands with scattered oak trees, and scrub or chaparral habitats (Shaffer et al. 1993, Service 2000). Juvenile and adult California tiger salamanders spend the dry summer and fall months of the year in the burrows of small mammals, such as California ground squirrels and Botta's pocket gopher (*Thomomys bottae*) (Storer 1925, Loredo and Van Vuren 1996, Trenham 1998). Burrow habitat created by ground squirrels and utilized by California tiger salamanders suggests a commensal relationship between the two species (Loredo et al. 1996). Movement of California tiger salamanders within and among burrow systems continues for at least several months after juveniles and adults leave the ponds (Trenham 2001). California tiger salamanders cannot dig their own burrows, and as a result, their presence is associated with burrowing mammals (Seymour and Westphal 1994). Active ground-burrowing rodent populations likely are required to sustain California tiger salamanders because inactive burrow systems become progressively unsuitable over time (Service 2004). Loredo et al. (1996) found that California ground squirrel burrow systems collapsed within 18 months following abandonment by, or loss of, the mammals.

California tiger salamanders have been found in upland habitats various distances from aquatic breeding habitats. In a trapping study in Contra Costa County, California tiger salamanders were trapped approximately 2,625 feet to 3,940 feet away from potential breeding habitat (Service 2004). During a mark and recapture study in the Upper Carmel River Valley in Monterey County, Trenham et al. (2000) observed California tiger salamanders dispersing up to 2,200 feet between breeding ponds between years. In research at Olcott Lake in Solano County, Trenham and Shaffer (2005) captured California tiger salamanders in traps installed 1,312 feet from the breeding pond.

Adults enter breeding ponds during fall and winter rains, typically from October through February (Storer 1925, Loredó and Van Vuren 1996, Trenham et al. 2000). Males migrate to the breeding ponds before females (Twitty 1941, Shaffer et al. 1993, Loredó and Van Vuren 1996, Trenham 1998). Males usually remain in the ponds for an average of about 6 to 8 weeks, while females stay for approximately 1 to 2 weeks. In dry years, both sexes may stay for shorter periods (Loredó and Van Vuren 1996, Trenham 1998).

Females attach their eggs singly or, in rare circumstances, in groups of two to four, to twigs, grass stems, vegetation, or debris in the water (Storer 1925, Twitty 1941). In ponds with little or no vegetation, females may attach eggs to objects, such as rocks and boards on the bottom (Jennings and Hayes 1994). In drought years, the seasonal pools may not form and the adults may not breed (Barry and Shaffer 1994). The eggs hatch in 10 to 14 days with newly hatched salamanders (larvae) ranging in size from 0.5 to 0.6 inch in total length (Petranka 1998). The larvae are aquatic. Each is yellowish gray in color and has a broad, plump head; large, feathery external gills; and broad dorsal fins that extend well onto its back. The larvae feed on zooplankton, small crustaceans, and aquatic insects for about 6 weeks after hatching, after which they switch to larger prey (Anderson 1968). Larger larvae have been known to consume smaller tadpoles of tree frogs (*Pseudacris* spp.) and California red-legged frogs (*Rana draytonii*) (Anderson 1968). California tiger salamander larvae are among the top aquatic predators in seasonal pool ecosystems.

The larval stage of the California tiger salamander usually lasts 3 to 6 months, because most seasonal ponds and pools dry up during the summer (Petranka 1998). Amphibian larvae must grow to a critical minimum body size before they can metamorphose to the terrestrial stage (Wilbur and Collins 1973). Larvae collected near Stockton in the Central Valley during April varied from 1.9 to 2.3 inches in length (Storer 1925). Feaver (1971) found that larvae metamorphosed and left the breeding pools 60 to 94 days after the eggs had been laid, with larvae developing faster in smaller, more rapidly drying pools. The longer the inundation period, the larger the larvae and metamorphosed juveniles are able to grow, and the more likely they are to survive and reproduce (Semlitsch et al. 1988, Pechmann et al. 2001). The larvae perish if a site dries before they complete metamorphosis (Anderson 1968, Feaver 1971). Pechmann et al. (2001) found a strong positive correlation between inundation period and total number of metamorphosing juvenile amphibians, including tiger salamanders.

Metamorphosed juveniles leave the breeding sites in the late spring or early summer. Like the adults, juveniles may emerge from these retreats to feed during nights of high relative humidity (Storer 1925, Shaffer et al. 1993) before settling in their selected upland sites for the dry, hot summer months. While most California tiger salamanders rely on rodent burrows for shelter, some individuals may utilize soil crevices as temporary shelter during upland migrations (Loredó et al. 1996). Mortality of juveniles during their first summer exceeds 50 percent (Trenham 1998). Emergence from upland habitat in hot, dry weather occasionally results in mass mortality of juveniles (Holland et al. 1990).

We do not have data regarding the absolute number of California tiger salamanders due to the fact that they spend most of their lives underground. Virtually nothing is known concerning the historical abundance of the species. At one study site in Monterey County, Trenham et al.

(2000) found the number of breeding adults visiting a pond varied from 57 to 244 individuals. A Contra Costa County breeding site approximately 124 miles north of the Trenham et al. (2000) study site in Monterey County showed a similar pattern of variation, suggesting that such fluctuations are typical (Loredo and Van Vuren 1996). At the local landscape level, nearby breeding ponds can vary by at least an order of magnitude in the number of individuals visiting a pond, and these differences appear to be stable across years (Trenham et al. 2001).

Lifetime reproductive success for California tiger salamanders is typically low. Less than 50 percent breed more than once (Trenham et al. 2000). In part, this is due to the extended length of time it takes for California tiger salamanders to reach sexual maturity; most do not breed until 4 or 5 years of age. Combined with low survivorship of metamorphs [in some populations, less than 5 percent of marked juveniles survive to become breeding adults (Trenham 1998)], low reproductive success limits California tiger salamander populations. Because of this low recruitment, isolated subpopulations can decline greatly from unusual, randomly occurring natural events as well as from human-caused factors that reduce breeding success and individual survival. Based on metapopulation theory (Hanski and Gilpin 1991), factors that repeatedly lower breeding success in isolated ponds that are too far from other ponds for migrating individuals to replenish the population further threaten the survival of a local population.

The California tiger salamander is threatened primarily by the destruction, degradation, and fragmentation of upland and aquatic habitats, primarily resulting from the conversion of these habitats by urban, commercial, and intensive agricultural activities (Service 2000; 2003; 2004). Additional threats to the species include hybridization with introduced nonnative barred tiger salamanders (*A. tigrinum mavortium*) (Service 2000, 2004), destructive rodent-control techniques (e.g., deep-ripping of burrow areas, use of fumigants) (Service 2003), reduced survival due to the presence of mosquitofish (*Gambusia affinis*) (Leyse and Lawlor 2000), and mortality on roads due to vehicles (Service 2000). Disease, particularly chytridiomycosis and ranaviruses, and the spread of disease by nonnative amphibians, are discussed in the listing rule as an additional threat to the species (Service 2004).

### *Recovery Objectives*

A recovery plan for the central California population of the California tiger salamander has not been completed; however, the 2004 listing rule (Service 2004) outlines conservation measures for protection and recovery of the species. The Service has concluded that protection and recovery of the California tiger salamander will require reduction of the threats from destruction, fragmentation, and degradation of wetland and associated upland habitats due to urban development, conversion of habitat to intensive agriculture, predation by nonnative species, disease, contaminants, agricultural and landscaping contaminants, rodent and mosquito control, road-crossing mortality, hybridization with nonnative tiger salamanders, and some livestock grazing practices. Threats from pesticide drift also must be reduced. These threats should be considered when management actions are taken in habitats currently and potentially occupied by the California tiger salamander, and areas deemed important for dispersal and connectivity or corridors between known locations of this species. Monitoring also should be undertaken for any management actions or scientific investigations designed to address these threats or their impacts.

## ENVIRONMENTAL BASELINE

### Action Area

The implementing regulations for Section 7(a)(2) of the Act define action area as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR, Part 402.02). The action area for this biological opinion encompasses all areas that may be directly or indirectly affected by construction and operation activities for the proposed project. It also encompasses the broader area that, while outside and next to the construction zone, may be directly or indirectly affected by vibrations, noise, dust, or movement associated with the proposed project. It also includes areas that may be affected by the implementation of the conservation measures.

The Action Area for this consultation consists of the following:

- 2,506-acre project footprint
- 2,514-acre Valley Floor Conservation Lands
- 10,722-acre Valadeao Ranch Conservation Lands
- 10,890-acre Silver Creek Conservation Lands
- Little Panoche Road from the Interstate 5 staging area to the intersection with Panoche Road
- County Roads where the speed limit of project vehicles is reduced

### Habitat Characteristics of the Action Area

The action area is in Fresno and San Benito Counties and lies on the western edge of the San Joaquin Valley in the Diablo Range. Soils in the area are derived predominantly from marine sediments (sandstone and shale). These support a sparse vegetative cover on most hillsides, with more vegetative cover generally associated with flatter valley floor areas and hillslopes at higher elevations.

The action area experiences a Mediterranean climate, with dry hot summers and cool wet winters. However, this region does not experience heavy rainfall. Annual precipitation in the general vicinity of the site ranges from 8 to 10 inches. Approximately 85 percent of precipitation falls between October and March. Temperatures average approximately 80 degrees Fahrenheit (°F) in the summer and 40°F in the winter; mid-summer temperatures are often over 100°F, and winter lows can be close to freezing. Nearly all precipitation infiltrates the site's soils and flows in creeks and drainages when soil capacity has been reached.

Habitats in the action area are largely composed of annual nonnative grasslands. Other habitats identified in the Action Area include subshrub/scrub lands, oak woodlands, and wetlands (PVS 2014). For a full description of habitat types, see Appendix F of the biological assessment (PVS 2014).

### Existing Conditions in the Action Area

The land in the general vicinity of the action area has been grazed for over 150 years. The Panoche Valley has historically been sparsely inhabited, with few buildings.

The proposed project footprint is dominated by introduced annual grasslands, but this area supports several seasonally flooded pools and stock ponds, predominantly in the northern portion along unnamed washes. Habitat for aquatic species and amphibians in the proposed project footprint is limited to the few stock ponds and ephemeral pools.

The Valley Floor Conservation Lands are dominated by introduced annual grasslands. These lands also contain Panoche and Las Aguilas Creeks, which are ephemeral streams that are dry in the summer. Smaller washes and drainages feed these larger creeks. The conservation lands also support seasonally flooded pools and stock ponds.

The Valadeao Ranch Conservation Lands are dominated by introduced annual grasslands and ephedra shrublands, though they support several relatively small upland habitats. The Valadeao Ranch Conservation Lands also contain wetlands: ephemeral, seasonal, and perennial springs and seasonally flooded ponds, stock ponds, and riparian habitats.

The Silver Creek Conservation Lands are also dominated by introduced annual grasslands and ephedra shrublands. These Lands also contain wetland habitats: seeps and springs, stock ponds, and riparian habitats along Panoche and Silver Creeks.

The conservation lands are surrounded by private cattle ranches and BLM-administered lands. The surrounding land uses are primarily cattle ranching and open space. BLM-administered lands are extensive in the Ciervo-Panoche Natural Area surrounding the site.

### Previous Consultations in the Action Area

We have no record of previous section 7 consultations or existing Section 10 habitat conservation plans in the action area.

### Status of the Species in the Action Area

Information to develop this section includes CNDDDB records, reports submitted to the Service, published literature, and surveys completed specifically for this project. A complete description of the survey methods utilized for this project can be found in the biological assessment and its appendices (PVS 2014).

### **Giant Kangaroo Rat**

The total giant kangaroo rat source population area in the Panoche Valley is estimated at 2,288 acres (Service 1998; Service 2010a). The Silver Creek Ranch supports approximately 90 percent (2,065.8 acres) of the source population area (Service 2010a).

Density estimates were not conducted for the entire action area. A literature review revealed estimates of giant kangaroo rat density, ranging from less than 1 to 271.7 per acre rangewide. Williams (1992) estimated the Panoche Valley population at 0.82 per acre. Most giant kangaroo rat research and studies to date have occurred in the southern portion of the range; however, three papers presented population density estimates for the northern portion of their range in the vicinity of the action area (Grinnel 1932; Williams 1992; and Williams et al. 1995). All three researchers presented densities estimated in above average precipitation years; therefore, the assumption is that the estimates in these papers are on the high end of population densities that may occur in normal precipitation years. The project proponents' biological assessment summarizes the results of these studies as they pertain to the vicinity of the action area (PVS 2014).

Biologists conducting reconnaissance surveys in April 2009 found evidence of giant kangaroo rat precincts and scat throughout the action area. Multiple focused biological surveys were conducted in the action area between 2009 and 2013; these surveys documented the presence of giant kangaroo rats in multiple locations. Survey methods included distance sampling, occupancy sampling, and 100 percent coverage surveys for the species, as well as additional biological surveys where evidence of giant kangaroo rat was observed incidentally.

#### *Distribution surveys*

A 100 percent coverage survey for giant kangaroo rat in the proposed project footprint was conducted, and a grid-based population estimate was completed in February/March 2013. Follow-up surveys were conducted in July 2013, to verify and update the status of inactive sites.

For field surveys, biologists used a grid sampling system whereby 30-meter by 30-meter grids were evaluated for the presence or sign of giant kangaroo rats. Grids were arranged along north-south parallel transects. Surveyors inspected each grid square for evidence of giant kangaroo rat precincts. Burrow precincts were considered occupied based on presence of scat, tracks, tail-drag, pit caches, fresh excavations, and cropped vegetation around a series of suitably sized horizontal and vertical burrow openings. Precincts that did not appear to be occupied were identified and mapped as inactive. Precincts were considered unoccupied when characteristic horizontal and vertical burrow openings and the surrounding area were devoid of fresh scat, tracks, fresh digging, and cropped vegetation. Evidence of other congeneric species was also noted and recorded as "other kangaroo rat."

In the proposed project footprint and Valley Floor Conservation Lands, the surveyed grid accounted for 100 percent coverage plus a 152-meter (500-foot) buffer in areas where landowner access was granted. Transects were systematically distributed across the proposed project footprint and Valley Floor Conservation Lands and included areas identified as high and low suitability habitats in past studies. The Valadeao Ranch and Silver Creek Conservation Lands were surveyed using the same method described above but with wider transects. No buffers were surveyed for these conservation lands since surveyors did not have landowner access outside these areas. These surveys were designed to cover approximately 20 to 30 percent of the conservation lands; therefore, transect spacing was approximately 148 meters.

A total of 48,446 survey grid cells were evaluated for giant kangaroo rat presence in the proposed project footprint (16,775 cells), Valley Floor Conservation Lands (11,190 cells), Valadeao Ranch Conservation Lands (10,166 cells), and Silver Creek Ranch Conservation Lands (10,309 cells). Active cells comprised 1.8 percent of cells in the footprint, 9 percent of cells in the Valley Floor Conservation Lands, 1 percent of cells in the Valadeao Ranch Conservation Lands, and 23 percent of cells in the Silver Creek Ranch Conservation Lands (PVS 2014).

Based on this survey information, giant kangaroo rat colonial concentrations were delineated and mapped. Four of the larger colony concentrations within the proposed project footprint were converted to avoidance areas and added to the Valley Floor Conservation Lands. These areas were selected due to the large numbers of concentrated active and inactive giant kangaroo rat precincts, the presence of high quality habitat, and direct connectivity to protected lands, such as the Valley Floor Conservation Land, Valadeao Ranch Conservation Lands, and adjacent BLM-administered land.

The survey results were used to estimate the number of giant kangaroo rats potentially supported in the proposed project footprint. Project biologists performing the surveys assumed, conservatively, that all 197 active cells were in high quality habitat, even though habitat quality in much of the proposed project footprint appears to be compromised due to past land use practices such as agriculture (PVS 2014). Without a density estimate of individuals per active cell, project biologists assumed that each active cell in the proposed project footprint is occupied by a minimum of at least one individual giant kangaroo rat. Using this minimum density estimate of one individual per active survey cell in the proposed project footprint, a minimum of 197 individuals would be expected to occur. Giant kangaroo rat populations can fluctuate significantly from year to year. It is reasonable to expect through natural recruitment that an increase in population would result in greater occupancy of the proposed project footprint.

Using a minimum density estimate of one individual kangaroo rat per active cell is likely to result in a severe underestimate of the actual number of individuals present. However, scientifically-derived densities of giant kangaroo rat in the proposed project footprint are not available in the literature. The only colony evaluated in Williams (1992) from the Panoche Valley was not trapped, and no density estimate for that colony was calculated. More broadly across the Panoche region, other density estimates are available for Silver Creek Ranch, in the vicinity of Valadeao Ranch, and on the east side of the Panoche Region in the vicinity of the Panoche Creek alluvial fan. Of these, the proposed project footprint is most likely more similar to Valadeao Ranch than Silver Creek Ranch or Panoche Creek, given the very high quality habitat conditions on the latter two compared to the lower quality of the project site habitat. Therefore, to develop a more accurate estimate of the number of individuals in the project area we used the maximum measured density for the Valadeao Ranch area, 7.9 giant kangaroo rats per acre (based on Williams et al. 1995) as a surrogate estimate for the project site. Using this approach, we determine that up to 347 giant kangaroo rats may be present in the proposed project footprint. After 4 years of drought conditions, the current population (in 2015) is expected to be lower than this projected density. We then applied a conservative 50 percent increase in the population ("Anticipated Population Growth Rate") from 2014 due to reproduction during several years of drought conditions. Based on these calculations, presented in Table 6, we estimate that 521 individuals may be affected by project activities.

The giant kangaroo rat is a species that has periodic population irruptions, resulting in large increases in numbers and potentially large areas of adjacent habitat becoming occupied over very short periods. Although these population increases may follow years of favorable precipitation, a direct causative link has not been determined. When these events occur, populations can increase greatly. While this type of population increase is an observed phenomenon, predicting the resulting population in a particular area (e.g., the proposed project footprint) is problematic and not the typical condition.

Threats to giant kangaroo rats in the action area include the conversion of native habitats to agriculture and other land uses, construction of solar energy facilities, and fragmentation of habitat from roads, transmission lines, and other linear features.

**Table 6**  
**Population estimate for giant kangaroo rat on the project site.**  
 (note: the estimate for the number of individuals is rounded up to the nearest whole individual, because you cannot have a fraction of an animal)

Active Survey Cells		Survey cell size		Active Acres	
197	x	0.2224 acres	=	43.8128	
Active Acres		Density Estimate (Individuals per Acre)		Number of Individuals	
43.8128	x	7.9	=	347	
Number of Individuals		Anticipated Population Growth Rate		Number of Individuals Expected in Project Footprint	
347	x	1.5	=	521	

### *Recovery*

The population of giant kangaroo rats in the action area is part of the Panoche Region population, one of the three largest populations of the species remaining (Service 1998). Specific recovery actions to protect habitat include protecting additional lands supporting key populations of the species. The Silver Creek Ranch is specifically identified as needing protection in the recovery plan. Project biologists used different survey methods for estimating the population levels on the conservation lands compared to the methods used for the project site. As a result, it is difficult to make an accurate comparison of the population size of giant kangaroo rats on the project site and on the conservation lands. Using the information provided by project biologists, 2,837 active surveys cells were identified on the conservation lands. If we apply the same estimate of 7.9 individuals per acre (Williams et al. 1995), presented in Table 7, we estimate the population of giant kangaroo rats on the conservation lands is 4,985 individuals. However, the methods of assessing population levels on the conservation lands were significantly different than those used on the project site. Due to these different methods, the

population estimate derived in Table 7 should be used cautiously in comparison to the estimate for the project site. Rather, we use these calculations to provide a coarse comparison between the areas; we conclude that giant kangaroo rats are present and likely in significantly higher numbers on the conservation lands compared to the project site.

**Table 7**  
**Population estimate for giant kangaroo rat on conservation lands.**  
 (note: the estimate for the number of individuals is rounded up to the nearest whole individual, because you cannot have a fraction of an animal)

Active Survey Cells		Survey cell size		Active Acres	
2,837	x	0.2224 acres	=	630.9488	
Active Acres		Density Estimate (Individuals per Acre)		Number of Individuals	
630.9488	x	7.9	=	4,985	

### San Joaquin Kit Fox

San Joaquin kit foxes are known to occur in the proposed project footprint. In addition to data collected in 2010 (135 5-acre plots visited 5 times each), a series of focused biological surveys have been performed on the proposed project footprint since April 2009. These surveys have provided general information about the abundance and distribution of San Joaquin kit foxes in the action area.

#### *Scat-Sniffing Dog Surveys*

Evidence of San Joaquin kit fox in the proposed project footprint, Valley Floor Conservation Lands, and portions of the Valadeao Ranch Conservation Lands was gathered during scat-sniffing dog surveys. These surveys were conducted between July 30 and August 16, 2010, and consisted of walking transects with dogs trained to detect San Joaquin kit fox scat (PVS 2014). During these surveys, scat specimens were collected and sent to the Smithsonian Institution for DNA analysis. Results of analysis indicate that 11 male and 11 female San Joaquin kit foxes were identified in the survey area. Sixteen San Joaquin kit fox occurred either in the proposed solar generation facility area or in close proximity to the proposed solar generation facility. Thirteen were located exclusively on the conservation lands. As the scat-sniffing dog surveys were conducted at the end of the summer 2010, the data collected represents an estimate of the number of individuals in the study area during a year of normal precipitation cycle.

#### *Spotlight Surveys*

Twenty full nighttime spotlight surveys on the Silver Creek Ranch Conservation Lands produced between 2 and 10 San Joaquin kit fox observations per night. A total of 137 detections of San

Joaquin kit fox and 11 detections classified as probable San Joaquin kit fox have occurred to date. Individuals were detected in drainages, on flat land, on hillslopes, and even on ridges or hills. The spotlight survey results provide information for presence of the species but were not able to distinguish individuals thus providing density or population size.

#### *Camera Trap Surveys*

San Joaquin kit foxes were recorded at 17 out of 20 camera stations on the Silver Creek Ranch Conservation Lands in October 2012. All camera traps were placed at least a half-mile from each other. The 17 detections occurred during 119 of 275 trap nights, resulting in approximately 43 percent detection rate. Individual camera trap detections of San Joaquin kit fox ranged from 0 percent to almost 64 percent detection. Only one station detected two individual kit foxes in the same photo; all other stations detected one at a time.

San Joaquin kit foxes rarely exhibit unique identifying features; thus, individuals are difficult to distinguish in a camera trap survey. Therefore, it is not possible to confirm the exact number that visited any given camera trap location (PVS 2014).

#### *Den locations*

Concurrent with the 2013 giant kangaroo rat surveys, all known San Joaquin kit fox den and natal den locations were recorded and mapped. A total of 45 dens was observed in the action area, 37 known adult dens and 8 natal dens. The Valley Floor Conservation Lands supported the highest number of dens (17 dens and 5 natal dens), followed by the Valadeao Ranch Conservation Lands (11 dens and 1 natal den), Silver Creek Ranch Conservation Lands (7 dens and 1 natal den), and the proposed project footprint (2 dens and 1 natal den).

Threats to San Joaquin kit fox in the action area include the conversion of native habitats to agriculture and other land uses, construction of solar energy facilities, and fragmentation of habitat from roads, transmission lines, and other linear features.

#### *Recovery*

The Ciervo-Panoche Natural Area of western Fresno and eastern San Benito Counties is identified as one of the three core populations of San Joaquin kit fox (Service 1998); San Joaquin kit fox in the action area would be included in this core population. Protection of natural lands in the Ciervo-Panoche Natural Area is identified as a specific recovery action in the recovery plan.

Impacts of genetic isolation may already be apparent in the Panoche population revealed by low allelic diversity. The Panoche population is located in a small, relatively isolated valley and also appears to be experiencing a low number of migrants into the population (Schwartz et al. 2005).

### **Blunt-Nosed Leopard Lizard**

The blunt-nosed leopard lizard is known to occur in the action area and in the vicinity of the project footprint.

Few study authors have calculated population density estimates for the blunt-nosed leopard lizard. Studies conducted in the Elkhorn Plain and Pixley National Wildlife Refuge estimated population density of blunt-nosed leopard lizard to be between 0.1 and 33.32 individuals per acre. None of these studies took place in a shrubless grassland habitat found in the Panoche Valley and proposed project footprint, so these population density estimates may not directly compare to the Panoche Valley but are the best density estimates available.

### *Abridged Surveys*

Abridged protocol-level adult blunt-nosed leopard lizard surveys (i.e., not for the complete duration required by the protocol) were completed between June 10 and July 15, 2009, on USGS Sections 10 and 15 of the USGS 7.5-minute Panoche quadrangle, in portions of the proposed project footprint and Valley Floor Conservation Lands. Surveys consisted of the following:

- 3.5 full-coverage surveys for adult blunt-nosed leopard lizard on Section 15 between June 10 and July 15, 2009
- Eight full-coverage adult blunt-nosed leopard lizard surveys on Section 10 between June 10 and July 15, 2009
- Five full-coverage juvenile blunt-nosed leopard lizard surveys Sections 10 and 15 between August 3 and September 1, 2009

In late April 2010, the project proponent initiated surveys and sampling spread over the entire proposed project footprint and Valley Floor Conservation Lands. This entailed full-protocol adult season blunt-nosed leopard lizards on Section 16, covering portions of both the proposed project footprint and the Valley Floor Conservation Lands.

No blunt-nosed leopard lizards were observed in Section 10 at any time during the 2009 surveys; however, two adults were detected in Section 10, in the 100-year floodplain of Las Aguilas Creek, during the occupancy sampling in 2010. The adult blunt-nosed leopard lizards in Section 15 were mainly found in association with Panoche and Las Aguilas Creeks, which is consistent with known habitat preferences of washes and floodplains (Warrick et al. 1998), especially in areas where dense vegetation comprises the upland habitat. Juvenile blunt-nosed leopard lizards were found along washes and farther into the upland habitat as they dispersed. Adult blunt-nosed leopard lizards were observed in and near Panoche Creek in Sections 10, 14, 15, and 16 during the 2010 surveys (see Figure 21 of PVS 2014).

No blunt-nosed leopard lizards were observed on the Valadeao Ranch Conservation Lands, although suitable habitat is contiguous with the western and southeastern edges of the proposed project footprint. Additional potential habitat occurs on the floor of Little Panoche Valley, in the northern portion of the Valadeao Ranch Conservation Lands.

### *Silver Creek Ranch Surveys*

Four blunt-nosed leopard lizards were observed on the Silver Creek Ranch Conservation Lands in dry washes during reconnaissance surveys between August 30 and September 3, 2010. In addition, focused blunt-nosed leopard lizard surveys were conducted on the Silver Creek Ranch

Conservation Lands in September of 2012. Because all blunt-nosed leopard lizards were observed in or near washes in the abridged protocol-level surveys in 2009 and full protocol-level surveys in 2010, the Silver Creek Ranch Conservation Land surveys targeted survey areas on the drainages of the ranch.

Blunt-nosed leopard lizard focused surveys were conducted from September 10 through 17, 2012, on the Silver Creek Ranch Conservation Lands. Surveys consisted of a team of three biologists traversing drainages on foot; one biologist walked in the drainage and two biologists walked on either side. Focused blunt-nosed leopard lizard surveys were conducted according to specifications in the survey protocol, except that drainages were targeted and surveys were conducted on September 17 (2 days past the range of survey dates in the protocol). However, Dr. Jennings, a noted California herpetologist assisting with the surveys, determined that the weather was still warm enough to continue with surveys, as evidenced by incidental blunt-nosed leopard lizard sightings through September 21, 2012.

During blunt-nosed leopard lizard focused surveys, juvenile blunt-nosed leopard lizards were observed in drainages, on hillslopes, and even on rocks on top of ridges. In addition, blunt-nosed leopard lizards were incidentally observed during giant kangaroo rat focused surveys from September 11 through 21, 2012. Most of these incidental observations were not associated with a drainage. Thirty-one blunt-nosed leopard lizards were observed during focused surveys, and there were 30 incidental blunt-nosed leopard lizard detections during giant kangaroo rat focused surveys. Sixty-one blunt-nosed leopard lizards were detected in a 2-week period. All blunt-nosed leopard lizards observed were juveniles, except for two subadults.

#### *Full Protocol Surveys*

Adult surveys were conducted over the 2013 season, between May 9 and July 13, 2013. No blunt-nosed leopard lizards were found in the proposed project footprint during the 2013 adult season surveys. During the same period, biologists observed a total of 27 blunt-nosed leopard lizards in the Valley Floor Conservation Lands with the majority of the observations associated with the wash habitat along Panoche Creek. This indicates that blunt-nosed leopard lizards were active in the area, with no observations in the project footprint.

Biologists completed hatchling and subadult 2013 season surveys between August 2 and September 10, 2013, during which a total of 13 blunt-nosed leopard lizards was observed. Most of the observations made during the hatchling and subadult season surveys were associated with the wash habitat along Panoche Creek in the Valley Floor Conservation Lands; however, there was one observation of a hatchling made in the proposed project footprint, just north of the Valley Floor Conservation Lands boundary that encompasses Las Aguilas Creek (PVS 2014). The proposed project footprint boundaries were modified to avoid this observation using a 52.4-acre buffer.

#### *Conservation Lands Surveys*

No species-specific surveys for blunt-nosed leopard lizard have been conducted in the Valadeao Ranch Conservation Lands, and no blunt-nosed leopard lizards have been incidentally observed

there during other surveys. Population density cannot be estimated for the Valadeao Ranch Conservation Lands until surveys have been completed; however, the assumption is that low-lying areas extending from the proposed solar facility footprint onto the Valadeao Ranch Conservation Lands may be included as suitable habitat for blunt-nosed leopard lizards based on the similarity of habitat characteristics in those low-lying areas to occupied areas identified during surveys.

Four blunt-nosed leopard lizards were observed on the Silver Creek Ranch Conservation Lands in 2010. These observations were made during reconnaissance-level surveys (not targeted to a specific species), all in the same drainage system. Sixty-one blunt-nosed leopard lizards were observed during the September 2012 focused surveys on the Silver Creek Ranch Conservation Lands (see Figure 22 in PVS 2014). Because the Silver Creek Ranch Conservation Lands provide more complex habitat than the proposed project footprint or Valley Floor Conservation Lands, blunt-nosed leopard lizard observations appear more widely distributed across the landscape and are not restricted to drainages.

Threats to blunt-nosed leopard lizards in the action area include the conversion of native habitats to agriculture and other land uses, and fragmentation of habitat from roads, transmission lines, and other linear features.

### *Recovery*

The Panoche Valley portion of the Silver Creek Ranch is identified in the recovery plan (Service 1998) as a high-priority target for land acquisition and protection. This area is included in the action area and is proposed for permanent conservation as the Silver Creek Ranch Conservation Lands.

### **California Tiger Salamander**

California tiger salamanders are known to occur with the Action Area and specifically within the Valley Floor Conservation Lands (CNDDDB 2015; D. Hacker, pers. comm.).

California tiger salamander larvae were observed in two ponds just west of the proposed project footprint during the 2009-2010 rainy season, protocol-level, vernal pool branchiopod surveys. One of the ponds is a large stock pond that still contained sufficient water for complete metamorphosis of California tiger salamander larvae by May 21, 2010. Seven larvae were netted at this location. The other pond is a vernal pool where California tiger salamander larvae were first observed in February 2010 during branchiopod surveys. During the May 21, 2010, sampling event, there were several dozen larvae in the pond attempting to metamorphose due to the drying of the pond. Some individuals may have metamorphosed successfully, though 10 larvae were observed desiccated in the shallow and muddy portions of the pond. Biologists conducting California tiger salamander larval surveys in March, April, and May 2010 also noted larval California tiger salamanders in these two ponds.

Two ponds occur in close proximity to each other in the northwestern portion of the project area in the Valley Floor Conservation Lands. California tiger salamanders were documented in one

of the ponds in 1996 and again in 2015 (CNDDDB 2015; D. Hacker, pers. comm.). Without protocol level surveys of both ponds and due to the close proximity to each other and the similar size and depth, we assume that both ponds are occupied by California tiger salamanders.

No California tiger salamanders were observed in the proposed project footprint during the 2009-2010 rainy season. However, breeding was confirmed in the two nearby off-site ponds discussed above. California tiger salamanders breeding in those ponds could estivate on portions of the proposed project footprint.

## EFFECTS OF THE ACTION

### **Effects of the Proposed Action on the Landscape**

The project would permanently impact 1,794 acres of suitable and/or occupied habitat for the giant kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander. Approximately 360 acres of the 1,794 acres of the permanent impacted area would be graded. In addition to the 1,794 acres of permanently impacted habitat, 712 acres of habitat would be temporarily impacted. To compensate for the effects of the project, the PVS has committed to permanently conserve and manage approximately 24,176 acres of adjacent lands supporting similar habitat.

The effects analysis for the proposed construction of the solar arrays, associated infrastructure, and telecommunication and powerline upgrades is unique in that grassland habitat potentially suitable for the species would still be present around and under the solar arrays and most areas of the transmission lines post-construction. Because little information exists on such effects to breeding, feeding, and sheltering, and based on information included in the biological assessment, we use the precautionary principle and postulate these "unnatural" structures in an otherwise undeveloped, open, flat landscape would alter the habitat such that the species may not use the habitat in the same way, or at all, as prior to the project. For the purposes of our analysis, we are assuming that the habitat beneath the solar arrays would not be used by giant kangaroo rats, San Joaquin kit foxes, or blunt-nosed leopard lizards after construction. Due to the life history of California tiger salamanders, we believe that they could potentially continue to use the panel arrays for movement to and from breeding ponds. However, California tiger salamanders would be captured and relocated from a majority of the project area (approximately 1,500 acres). Early observations on the California Valley Solar Ranch in the Carrizo Plain, California, indicate that giant kangaroo rats and San Joaquin kit foxes may, in at least the short term, continue to utilize areas with solar panel arrays in some capacity (H.T. Harvey 2015).

Rows of panels would be spaced approximately 10 to 35 feet apart to prevent shading of adjacent rows. It is expected that all areas under and between the panel arrays would receive shade throughout a portion of the day. Shading from the panel arrays could affect the composition and structure of the annual grassland and could affect federally listed species in the area. Studies have shown that shading can enhance the production of herbaceous vegetation, cause a shift from small to large seeded grasses and legume species, and suppress native perennial grasses (Frost and McDougald 1989; Dyer and Rice 1999).

Reduced evapotranspiration and water stress from partial shading and water input from panel washing would likely result in increased dominance (taller and denser stands) of non-native grasses. We assume that the species composition would shift slightly to a larger percentage of shade-tolerant species and a change in composition and structure different from that of existing open grassland conditions. The proposed grazing of the area under and around the panel arrays is expected to reduce the effects from this change in vegetative structure. The area of the project site that would be disturbed by construction would be revegetated with native species that occur in the vicinity of the project site. From strictly a vegetative species perspective, the grassland community in the panel arrays could remain suitable for the giant kangaroo rat, San Joaquin kit fox, and blunt-nosed leopard lizard, particularly with a focused grazing management regime to maintain a suitable vegetative structure; however use by these species may not occur due to other factors such as vegetation density and the presence of unnatural structures. In summary, the increased ground shading caused by the solar arrays may change the vegetative species composition and structure. We anticipate the composition would likely shift towards more shade tolerant species. These shade tolerant species may not be a preferred forage source for giant kangaroo rats; therefore, the species may not use the area even if the grazing program maintains a suitable vegetation density. San Joaquin kit foxes may be less likely to use the area if giant kangaroo rats are not present as a prey source. Blunt-nosed leopard lizards and California tiger salamanders may experience a reduced number of burrows for sheltering if giant kangaroo rats are not present.

The amount of solar energy reflected from an area is dependent on the solar energy impacting that area and the property of the material or surface receiving that incoming energy. Very dark materials would reflect less energy than very bright surfaces. Solar energy that is not reflected is absorbed and stored as heat, and then dissipated over time. The installation of solar arrays would introduce structures that would alter the solar energy exchange on the grasslands. Current conditions at the project site allow for 100 percent of sunlight to reach the ground with a portion reflected and the remaining absorbed and stored as heat. With the installation of solar arrays, a change in reflectance and absorption is important to consider if phenomena of a heat island might occur (Bornstein 1968). An Urban Heat Island is a phenomenon whereby a developed area is significantly warmer than surrounding undeveloped areas. Bornstein (1968) showed that the Urban Heat Island is caused by three factors: (1) waste heat from energy usage, such as engines that run on electricity, natural gas, and oil, (2) use of massive materials which store more heat and dissipate heat slowly, and (3) use of materials which absorb more solar radiation. Although waste heat may be emitted by the inverters and other equipment on-site, it is not expected to be a significant source of heating in a photovoltaic array. An analysis for the California Valley Solar Ranch determined the arrays similar to those proposed for this project would absorb slightly more, approximately 0.4 MW hour/acre/day (the constant rate of energy absorption per hour), solar radiation than a grassland with no panels (SunPower 2010). The lower mass of the thin and lightweight PV panels would dissipate heat more quickly than the ground. Although we do not have site specific information, studies at solar generation facilities in the Mojave Desert have shown an increase of approximately one degree Celsius as a result of the Urban Heat Island effect (B. Sinervo, pers. comm.). Considering the factors discussed above, we anticipate the area under, above, and around the solar arrays may experience subtle heating and cooling changes, but are not expected to be substantially different from current conditions. For the purposes of our analysis because we lack scientific information on how species are

affected by the installation of panel arrays, we are assuming the species would not use these areas for most of their needs because the natural conditions to which they are adapted would have changed.

### **Effects of Decommissioning and/or Repowering**

We cannot specifically analyze the effects of decommissioning at this time. The specific actions that will be undertaken and the status of the species in the future (minimum 30 years) are uncertain. We anticipate the effects of decommissioning to each species will be similar to those described for construction activities below so that our analysis of construction impacts to species also applies to decommissioning and repowering. Decommissioning and repowering impacts are not discussed separately below.

### **Effects of the Proposed Action on Giant Kangaroo Rat**

Development of the solar arrays and associated infrastructure would result in the temporary and permanent disturbance of 2,506 acres. Construction of the panel arrays, project roads, and telecommunication and powerline infrastructure would result in a permanent loss of 1,794 acres of suitable and/or occupied giant kangaroo rat habitat. Approximately 360 acres of the 1,794 acres would be graded to reduce the slope of the land for panel installation or for road construction. The remaining area will not require grading. An additional 712 acres would be temporarily impacted during construction of roads, installation of the perimeter fence and collector lines, work areas, and the construction pond. These 2,506 acres of temporary and permanent impacts would occur within suitable habitat for the giant kangaroo rat, primarily on the solar generation facility site. Early observations at the California Valley Solar Ranch indicate that giant kangaroo rats have inhabited the solar arrays areas (H.T. Harvey 2015). Because literature on the long-term effects of solar arrays on terrestrial wildlife is limited, the potential for this species to re-inhabit the land under panel arrays after installation is possible, but cannot be expected. Therefore, we conclude that the 2,506 acres of giant kangaroo habitat affected permanently or temporarily by construction activities would likely not be re-occupied by the species.

### **Effects of the Giant Kangaroo Rat Relocation Plan**

Per the Giant Kangaroo Rat Relocation Plan, the Applicant's biologists would capture and relocate individuals within the 2,506 acres of temporary and permanent impacts (PVS 2014). Based on 2014 survey efforts, giant kangaroo rats currently occur on a portion of the proposed solar generation project site. Surveys were not completed for the power line and telecommunication improvement portions of the project; however, the areas identified for those portions support suitable habitat for the giant kangaroo rat. Surveys to collect density estimates were not conducted, so there is no site-specific way to determine the number of individuals that may be present in the affected areas, therefore we use the best information available. As discussed in the Status of the Species section, we used a density estimate developed by Williams et al. (1995) to derive a population estimate for giant kangaroo rats on the project site (refer to Table 6, in the Status of the Species section of this document).

Based on the best information available, the Service estimates that 521 giant kangaroo rats would be captured and relocated from the project footprint and the proposed 50-foot buffer around project construction for relocation. This number accounts for a conservative 50 percent increase in the population ("Anticipated Population Growth Rate") from 2014 due to reproduction during several years of drought conditions. The Giant Kangaroo Rat Relocation Plan was developed to capture and remove all individuals from the areas of disturbance. At the discretion of the designated biologist, exclusion fencing would be in place to prevent potential re-occupation of the area until construction is complete and the fencing is removed. If exclusion fencing is not used, individuals would be subject to recapture if they disperse back into the project site before all precincts are excavated. Based on the comprehensive nature of the proposed Giant Kangaroo Rat Relocation Plan, we anticipate that with implementation of the plan all individuals within the 1,794 acres of permanent impact would be captured and relocated. Prior to construction in any area, all precincts, occupied or unoccupied, will be excavated. We do not anticipate that giant kangaroo rats will attempt to create new precincts during construction activities. Captured individuals may burrow under their relocation enclosures and could disperse back into a burrow in the project area that has not yet been excavated. These individuals are expected to be captured and relocated during future efforts on the project area. The risks of capture and relocation, and measures to minimize and avoid these risks, are fully described in the biological assessment and the Giant Kangaroo Rat Relocation Plan (PVS 2014). Survivorship of translocated wildlife, in general, is reduced due to intraspecific competition, lack of familiarity with the location of potential breeding, feeding, and sheltering habitats, and increased risk of predation. The Giant Kangaroo Rat Relocation Plan addresses these issues through a robust relocation strategy. Individuals would be released in adjacent areas providing suitable refugia, including inactive precincts and/or artificial burrows and provisioned with seed reserves. We anticipate that giant kangaroo rats could attempt to disperse from the relocation area or be reluctant to use new burrows; these individuals could be subject to increased predation, or could disperse into unsuitable habitat where their survival or reproduction would be reduced. Also, some individuals may suffer mortality in traps or during handling. There is some potential for injury or mortality of individuals during this translocation process. Based on a similar capture and relocation plan for the California Valley Solar Ranch, approximately 2 percent of captured individuals died as a result capture activities (J. Sloan, pers. comm.). We expect the similar rate of injury and mortality from the capture and relocation activities on the project site. Thus, we conclude that 11 individuals may be subject to injury or mortality from capture/relocation activities.

### Effects of Project Construction

Solar arrays would be installed in areas that are characteristic of optimal giant kangaroo rat habitat: open, low relief, with a slope less than 11 percent. The area underneath and within shading distance of the array structures may be altered due to changes in vegetation structure and environmental conditions to such an extent that giant kangaroo rat abundance or use is reduced. This would constitute a loss of suitable habitat for foraging, shelter, and breeding.

Giant kangaroo rats avoid areas of dense shrub cover and the solar arrays could create an artificial structure similar to tall vegetation or shrubs that would be avoided by the species. We expect the effects from shading, increased soil moisture, and change in vegetation composition

under the solar arrays to render 1,629 acres of currently suitable and/or occupied habitat to no longer be suitable for the species (Smith 1984; Smith et. al 1987). The 1,629 acres under the panel arrays and the estimated 165 acres of other permanent impacts such as the roads and the O&M building (1,794 acres total), are considered removed from potential inhabitation by the giant kangaroo rat.

Employing underqualified monitors could result in adverse effects to giant kangaroo rats. If monitors do not have adequate training to detect sign of giant kangaroo rat, presence of the species in the area may not be recognized. Any giant kangaroo rats or their habitat not correctly identified would be subject to the effects described below. Service review and approval of the designated biologists would ensure that the monitors are appropriately qualified.

Vehicles and construction equipment could destroy or damage giant kangaroo rat habitat. Vehicles driven through burrow precincts could crush burrows and pit-caches or “haystacks” (above ground seed curing areas), disrupt paths, and vehicles would compact loose soils used by giant kangaroo rats for sand bathing. Vehicular traffic could also damage vegetation and degrade food resources. Construction equipment could crush individual kangaroo rats or entomb individuals in burrows as a result of soil compaction.

Ground disturbance would affect any giant kangaroo rats present in areas impacted by construction activities. The solar panels would be mounted on metal frames anchored with a foundation piles. Piles driven into the ground to anchor the solar arrays would disrupt burrows if placed within precincts and may result in mortality or injury through direct contact or as a result of burrows crushed by vehicles or equipment or potential entombment of individuals from vibrational collapse of burrows. However, capture and relocation of all giant kangaroo rats out of the project area prior to construction, as proposed by the Applicant, would eliminate this risk of injury or mortality to individuals.

Trenching required for burial or repairs of power and communications cables would directly affect giant kangaroo rats where trenches are excavated through precincts. Open trenches would create impassable barriers that could disrupt movement between burrows and foraging areas. Giant kangaroo rats could fall into the trenches and be vulnerable to predation, starvation, and entombment. Placement of escape ramps in trenches or other excavated areas, as proposed by the Applicant, would minimize this risk.

Noise and ground vibrations from the use of heavy equipment during construction could result in temporary threshold shifts in hearing sensitivity for giant kangaroo rats (reduction in hearing ability) that are in the vicinity of the project activities have not yet been captured and relocated. Shifts in hearing sensitivity could negatively affect foraging success as this nocturnal species relies primarily on hearing to detect predators and other threats (Vernon et al. 1971). Noise generated by the rotary drill and other heavy equipment could cause temporary threshold shifts that could last for an extended period of time (i.e., up to 30 days). Giant kangaroo rats communicate through drumming of their hind feet. The drumming is used to defend territories and warn of the presence of predators. Noise impacts from construction machinery or array pile driving could disrupt giant kangaroo rat hearing to a point that this means of communication is

ineffective and could lead to increased intraspecific competition and an increased rate of predation.

Spillage or leakage of industrial chemicals, fuels, and lubricants could result in fouling or poisoning of giant kangaroo rats and contamination of their habitat. Properly enforced, the spill prevention plan proposed by the Applicant would minimize, if not eliminate, this risk to giant kangaroo rats.

Giant kangaroo rats could be killed or injured due to predation by species such as red fox, coyote, or domestic dogs that are attracted to the area by trash discarded by personnel during construction. However, capture and relocation of all giant kangaroo rats out of the project area prior to construction, as proposed by the Applicant should minimize, if not eliminate the risk of predation within the solar generation facility. In addition, the Applicant's plan to regularly remove trash from the project area would eliminate the attractant for other wildlife and reduce the potential for predation of giant kangaroo rats during construction.

New structures in the project area would provide new perching structures for avian predators, such as barn owls (*Tyto alba*) and great horned owls (*Bubo virginianus*); this could enhance their ability to prey on giant kangaroo rats. Kangaroo rats have shown a decrease in activities during bright moonlight (Upham and Hafner 2013). Any nighttime lighting on the project site could result in better visibility for predators and a decrease in activity for giant kangaroo rats. Giant kangaroo rats remaining in the areas adjacent to the new structures or lighting outside of the areas of the capture and relocation activities could be subject to these effects. Similarly, any giant kangaroo rats that do migrate back towards or near the project area after construction activities cease would be subject to this effect.

#### Effects of Operations and Maintenance

Preliminary results at the California Valley Solar Ranch indicate that giant kangaroo rats have re-inhabited the panel arrays shortly after construction activities ceased (H.T. Harvey 2015). Based on this information, we believe some giant kangaroo rats may attempt to recolonize the areas within the panel areas following construction of the project. However, we do not have research to indicate what the long-term effects might be. In particular, we do not have information to inform what giant kangaroo rat response may be to vegetation changes caused by shading from the solar panels; the effects of shading and potential changes in vegetative composition may render the habitat under and around the solar panel arrays unsuitable or suboptimal for giant kangaroo rats. Therefore, we cannot expect the species to re-inhabit the areas under the panel arrays on a long-term basis. If the species does re-inhabit the area following construction, even in the short-term, those individuals would be subject to the effects of operations and maintenance activities as described below. If the recolonizing individuals are subsequently killed or injured due to the effects described below, the habitat is anticipated to remain available to other individuals of the species and could be re-occupied again. These effects could be repeated over the duration of the operation and maintenance period and affect multiple individuals over time. The likelihood of impacts from these effects would increase with any increase in the number of individuals that re-occupy the area. In this manner, the project site could act as an ecological

trap (Kristan 2003) resulting in ongoing impacts to the species throughout the existence of the facility.

The project would result in a change to the current grazing regime from cattle to sheep. While working dogs used by ranchers conducting the grazing and management programs could chase, injure, or kill giant kangaroo rats, changing the grazing regime could have a greater effect on the abundance or distribution of giant kangaroo rats. Under the current land use in the proposed Action Area, intensive cattle grazing reduces vegetation height, density, and maintains species composition, which provides beneficial habitat conditions for the giant kangaroo rat. The areas that are currently occupied by giant kangaroo rats are dominated by a sparse to dense but closely cropped cover of annual grasses and forbs. Any changes in vegetation resulting from the change in grazing regime could be either beneficial or detrimental to giant kangaroo rats, which prefer grassy habitat and avoid areas with dense shrub cover. However, any effect from the change in grazing from cattle to sheep and goats in the array footprint is not likely to significantly change vegetation conditions such that it reduces habitat suitability for giant kangaroo rats. A change in the grazing regime alone is not considered a restriction to the potential for giant kangaroo rats to re-inhabit area under the solar arrays. This area is already considered lost for the species because it would occur under or next to the panel arrays and subject to the effects described above.

Vehicles used for maintenance and panel washing could destroy or damage giant kangaroo rat habitat if the species re-inhabits the panel arrays. Vehicles driven off established roads and potentially through burrow precincts could crush burrows and pit-caches or “haystacks”, disrupt paths, and vehicles would compact loose soils used by giant kangaroo rats for sand bathing. Vehicular traffic could also damage vegetation and degrade food resources. Construction equipment could crush individual kangaroo rats or entomb individuals in burrows as a result of soil compaction.

Giant kangaroo rats could be killed or injured by being hit or run over by nighttime worker traffic or security patrols during project construction or operations and maintenance activities. All nighttime traffic would be required to maintain a posted 10 mph speed limit on the project site, and would be required to remain on the existing roads except when emergency response requires vehicle access to off-road areas. Nighttime security patrols during operations and maintenance of the proposed project could result in vehicle strikes and mortality or injury to giant kangaroo rats if they re-inhabit the panel arrays. The likelihood of vehicle strikes would increase during nighttime activities when giant kangaroo rats would be out of their burrows foraging.

Use of rodenticides could directly affect giant kangaroo rats through poisoning resulting in mortality or sublethal doses. Sublethal doses could result in changes in the behavior that may increase individual giant kangaroo rats to the effects of exposure and predation. Limiting the use of rodenticides as described in the Project Description section would minimize the risk to giant kangaroo rats.

New structures in the project area would provide new perching structures for avian predators and could enhance their ability to prey on giant kangaroo rats. Any nighttime lighting on the project

site could result in better visibility for predators and a decrease in activity for giant kangaroo rats.

### Effects of Conservation Lands

The conservation measures including habitat preservation and management would protect suitable habitat for giant kangaroo rats. The Valley Floor Conservation Lands and large portions of the Silver Creek Ranch Conservation Lands are currently occupied habitat. Current land use in the conservation lands is compatible with giant kangaroo rat persistence and conditions appear to be near optimal for the species. The proposed management actions and enhancements will provide protection from incompatible future land uses and maintain an optimal grazing regime for the species. Despite the conservation of existing habitat, the project would still result in a net loss of suitable and occupied habitat for the species. The ultimate effect of conservation of the Valley Floor and Silver Creek Ranch areas would be preservation of suitable habitat.

### Effects on Recovery

The permanent removal of 1,794 acres of suitable habitat would reduce the overall area of potential population and meta-population expansion in the Ciervo-Panoche Natural Area. It would also reduce protection for the giant kangaroo rat against stochastic events (e.g., landslides, floods) that require large areas to allow the species to redistribute across the landscape during or after an event. The capture and relocation efforts should reduce the overall impact to recovery of the species by moving all individuals in the project area from harm's way to areas that are protected and managed for the species. We have concluded that a small portion (2 percent) of individuals captured would be killed or injured and thus removed from the local population. The ultimate success of the relocation would be difficult to determine given the biology of the species and natural local population extinction and repopulation cycles.

If successful, the capture and relocation of giant kangaroo rats could alter the genetic structure of the metapopulations in the Ciervo-Panoche Natural area. Relocating individuals as close to the capture location and in proximity to neighboring individuals would reduce the potential for adverse artificial genetic manipulation and maintain the function of the metapopulation structure in the area.

We expect the relocation of giant kangaroo rats would be mostly successful and would reduce the overall impact from the proposed project. We do not expect many giant kangaroo rats to re-inhabit the lands under the panel arrays; although any that do attempt to re-inhabit the area are likely to experience reduced reproductive fitness and would be subject to other adverse effects, including injury or death, caused by operations and maintenance activities. Because we expect the relocation efforts to be largely successful and we expect relatively few individuals to recolonize the habitat under the panel arrays, we expect operations and maintenance activities to affect a small number of individuals. Therefore we conclude the effects to the species and to recovery are expected to be minimal.

The Silver Creek Conservation Lands would protect and manage an area identified in the Recovery Plan as important for recovery of the species (Service 1998). Although occupied and

suitable habitat would be removed and mortality of some individuals is expected, we conclude that implementation of the proposed project is expected to have minimal effect on recovery of the species due to preservation of occupied habitat in the conservation lands and minimizing mortality of individuals through the capture and relocation efforts.

### Summary of Effects to Giant Kangaroo Rat

In determining whether the effects of a proposed action are likely to jeopardize the continued existence of the giant kangaroo rat, we must consider whether the effects will reduce the reproduction, numbers, and distribution of the species and the impacts on recovery. In assessing these factors, we take into account measures proposed to avoid and minimize impacts to giant kangaroo rats during project activities.

#### *Reproduction*

If capture and relocation activities were to occur during mating season, individual giant kangaroo rats captured and relocated to burrows with inclusion fencing (to prevent immediate dispersal) would be removed from reproduction for the year. If any lactating females are captured during relocation efforts, the female would be returned to the burrow until the young have matured to be on their own. Burrows with young present would not be excavated. However, we do not expect implementation of the proposed project to affect overall reproduction of the giant kangaroo rat in the action area because the individuals that may be captured and relocated only represent a small portion of the individuals in the region. At the species level, the minor effect to the local reproduction of the giant kangaroo rat likely to result from the proposed action would not reduce the ability of the species to reproduce rangewide. We anticipate that the reproduction dynamics of the local metapopulation may shift slightly but the ability for the species to reproduce across all metapopulations in the Ciervo-Panoche Natural Area and the rangewide population would not be affected.

#### *Numbers*

We expect that some giant kangaroo rats will be killed or injured during the construction and future operation and maintenance of the proposed solar facility. The capture and relocation efforts, and other minimization and avoidance measures incorporated into the project including avoiding areas of high density, are expected to reduce the potential loss of individuals that would otherwise be killed or injured by construction activities and vehicles. Mortality of a few individuals is expected as a result of capture and relocation efforts. We estimate this at 2 percent of the estimated total captures (521) or 11 individuals. The relocated individuals would be provided with a food source that would not only increase the likelihood that they will remain in the new burrow, but also increase the likelihood that they will survive and reproduce during the next breeding cycle. While we do not have data sufficient to make a firm rangewide population estimate, the potential loss of 11 individual giant kangaroo rats would be minor in comparison to the local metapopulation and would represent an even smaller percentage of the regional group of metapopulations and rangewide populations of the species. We conclude that while some individual giant kangaroo rats may be killed or injured, the numbers rangewide will not be reduced because such losses are likely to only have a temporary effect to the local population.

While we anticipate some potential mortality associated with operations and maintenance, we expect it to occur infrequently and to affect a low number of individuals and therefore an insignificant percent of the rangewide population.

### *Distribution*

The local distribution of the species would be altered due to the removal of occupied habitat and suitable habitat for local range expansion. Also, relocated individuals would change the distribution if relocated to an area not currently occupied or increase the density of the area if relocated to an inactive burrow system in an occupied area. However, linkages between the local and rangewide metapopulations are expected to be maintained through the establishment of the Valley Floor Conservation Lands. The species' larger geographic range includes portions of at least five counties on the western side of the San Joaquin Valley. We conclude that despite some changes to the species' local distribution, the proposed action would not reduce the rangewide distribution of the giant kangaroo rat.

### *Recovery*

The removal of occupied and suitable habitat would reduce the overall area of potential population and meta-population expansion in the Ciervo-Panoche Natural Area. It would also reduce protection against stochastic events that require large areas to allow the species to redistribute across the landscape during or after an event. The capture and relocation of giant kangaroo rats, while an important measure to reduce giant kangaroo rat mortality, could alter the genetic structure of the metapopulations in the Ciervo-Panoche Natural area through introduction of individuals to areas of different genetic diversity. Establishment of the Silver Creek Ranch Conservation Lands would benefit the giant kangaroo rat by providing protection and management of an area identified in the Recovery Plan as important for recovery of the species (Service 1998). The conservation and management of Silver Creek Ranch Conservation Lands would protect a large area with a dense population of giant kangaroo rats. Conservation of these lands along with conservation lands established by solar facilities in the Carrizo Plains would provide a series of large, protected habitat areas for the species to inhabit. Although some occupied and suitable habitat would be removed and mortality of a few individuals is expected, implementation of the proposed project would have minimal effect on, and would not impede recovery of the species due to preservation of important occupied habitat in the conservation lands and the capture and relocation measures incorporated into the project to minimize mortality to giant kangaroo rats.

### **Effects of the Proposed Action on San Joaquin Kit Fox**

Development of the solar arrays and associated infrastructure would result in the temporary and permanent disturbance of 2,506 acres. Construction of the panel arrays, project roads, and telecommunication and powerline infrastructure would result in a loss of 1,794 acres of suitable and/or occupied San Joaquin kit fox habitat. An additional 712 acres would be temporarily impacted during construction of roads, installation of the perimeter fence and collector lines, work areas, and the construction pond. The entire proposed project footprint contains suitable habitat for the San Joaquin kit fox.

Individual kit foxes occur on the project site and are breeding, feeding, and sheltering within the project footprint. We have little survey information to identify the current number of individuals using the project area. Based on the 2010 scat-sniffing dog surveys, 22 individual San Joaquin kit foxes used the action area or used areas in proximity to the action area. We anticipate that any individuals currently using the project area could be affected directly or indirectly by project activities.

To minimize the project's effects on the reproduction of San Joaquin kit fox, the Applicant proposes to survey for and avoid natal dens in the project footprint. These actions should reduce many project related impacts to the species occurring within the solar generation facility. Early observations at the California Valley Solar Ranch indicate that San Joaquin kit foxes use the solar array areas in at least a limited capacity for movement (H.T. Harvey 2015). Because literature on the long-term effects of solar arrays on terrestrial wildlife is limited, the potential for this species to re-inhabit the land under panel arrays after installation is possible, but cannot be expected. Therefore, we conclude that San Joaquin kit fox numbers in the area of the arrays would be reduced.

Arid systems are characterized by unpredictable fluctuations in precipitation, which lead to high frequency and high amplitude fluctuations in the abundance of mammalian prey for the San Joaquin kit fox (Goldingay et al. 1997; White and Garrott 1999). Because the reproductive and neonatal survival rates of the San Joaquin kit fox are strongly depressed at low prey densities (White and Ralls 1993; White and Garrott 1997, 1999), periods of prey scarcity owing to drought or excessive rain can contribute to population crashes and marked instability in the abundance and distribution of the San Joaquin kit fox (White and Garrott 1999). Frequent, rapid decreases in San Joaquin kit fox density can increase the extinction risk for small, isolated populations. The relocation of giant kangaroo rats from the project footprint may reduce the potential for San Joaquin kit foxes to persist in and around the solar arrays. Preliminary data from the California Valley Solar Ranch suggests that San Joaquin kit foxes may use the land under and around the panel arrays to some extent, at least in the short term (H.T. Harvey 2015). San Joaquin kit foxes were observed traveling through operational arrays, using the shade of the installed photovoltaic solar panels, and moving through and sitting along access roads; however, there were no observations of natal activity in the California Valley Solar Ranch project area during the San Joaquin kit fox reproductive period (H.T. Harvey 2015). Because of the uncertainty of the long-term effects and the lack of data to support that San Joaquin kit fox would persist in such an altered environment, we conclude the area under and around the panel arrays would likely be unsuitable for San Joaquin kit foxes.

The project area in the Panoche Valley provides open, flat habitat for San Joaquin kit fox movement through the landscape and the Ciervo-Panoche Natural Area. The Panoche Valley is surrounded by steep mountain ranges that present topographic barriers to San Joaquin kit fox movement. Construction of the proposed project would remove optimal habitat for the species and reduce the amount of suitable habitat available for movement through the landscape and the Ciervo-Panoche Natural Area. A habitat corridor designed into the project extends through the center of project area, and should provide connectivity between the southern portion of the Panoche Valley and the northern extent of the project, Little Panoche Valley, and further to the San Joaquin Valley.

### Effects of Project Construction

Solar arrays would be installed in an area that is characteristic of optimal San Joaquin kit fox habitat: open, low relief, with a slope less than 6 percent. A change in activity in the area with an increase in human presence, noise, and structure could disturb individual San Joaquin kit foxes and disrupt normal behavioral patterns. This would constitute a loss of suitable habitat for foraging, shelter, and breeding.

Employing underqualified designated monitors could result in adverse effects to San Joaquin kit foxes. If designated monitors do not have adequate training to detect sign of San Joaquin kit foxes, presence of the species in the area may not be recognized. Any San Joaquin kit foxes or their dens not correctly identified would be subject to the effects described below. Service review and approval of the designated biologists would ensure that the monitors are appropriately qualified.

Direct destruction of a den or disturbance of a den from construction activities could result in the loss or abandonment of active San Joaquin kit fox dens. During the 2010 surveys, two active dens and one natal den were observed in the project footprint. Active natal or shelter dens may be abandoned if covered by solar arrays due to human presence, disturbance, or altering of the habitat. Depending on the age and development, San Joaquin kit fox pups present in natal dens may be subject to increased exposure, stress, and predation. If the pups are not mobile, the parent San Joaquin kit foxes may abandon a natal den leaving the pups behind; the abandoned pups may be crushed or entombed by construction activities. Proper identification of dens and den activities, avoiding den destruction, and establishing appropriate buffers would reduce the risk of adversely affecting denning San Joaquin kit foxes (Althouse and Meade 2015). The Applicant's proposal to establish buffers around San Joaquin kit fox dens would reduce or eliminate the potential for adverse effects to San Joaquin kit fox using those dens.

Mortality, injury, and harm of San Joaquin kit foxes by vehicles, heavy equipment, excavation, and grading could occur during construction activities. Mortality or injury of San Joaquin kit foxes could occur due to vehicle strikes from traffic in the action area during construction. The project will substantially increase traffic to the local area. Approximately 40 percent of the personnel and all of the equipment and supplies will enter the project site from the north on Little Panoche Road. Approximately 60 percent of the personnel will enter the project site from the southwest but still increase traffic on Little Panoche Road. This increase in traffic along Little Panoche Road, which bisects the Panoche Valley and the project site, is expected to be 1,750 percent over baseline levels during peak construction (PVS 2014). The potential for vehicle strikes would be greatest during dawn and dusk when the majority of personnel would be arriving and departing the project site and during required night-time activities such as PV panel connection. Although the project description states that all project related vehicles would maintain a 25 mph speed limit on County Roads adjacent to the solar generation site, this measure may not be enforceable. Research published by the National Cooperative Highway Research Program (2003) found that in rural settings adherence to posted speed limits was between 37 and 72 percent. The same research study found that drivers adhered to a posted 25 mph speed zone at a rate of only 42 percent. Studies have indicated that mortality from vehicle strikes remains a threat to similar canine species in areas with strict low speed limits, such as

military installations (Snow et al. 2012). There is the potential for increased vehicle strikes on the County roads leading to and through the project area due to the increase in traffic to the area from project-related activities.

Injury or mortality of individual San Joaquin kit foxes could occur as a result of predation by or competition with species such as the red fox, coyote, or domestic dogs that might be attracted to the proposed project area by trash discarded by personnel during construction, or if proposed project activities cause an increase in prey availability for these species. The Applicant will prohibit domestic dogs on site, which should reduce this risk. The Applicant's plan to regularly remove trash from the project area would eliminate the attractant for other wildlife and reduce the potential for predation on San Joaquin kit foxes during construction.

Accidental spillage or leakage of industrial chemicals, fuels, and lubricants could result in poisoning of San Joaquin kit foxes and contamination of their habitat. Rodent species poisoned by industrial chemicals and ingested by San Joaquin kit foxes may result in secondary poisoning. Properly enforced, the spill prevention plan proposed by the Applicant would minimize, if not eliminate, this risk for the San Joaquin kit fox.

Noise and ground vibrations from the use of heavy equipment and pile driving during construction could result in temporary reduction in hearing sensitivity, which could negatively affect foraging success of San Joaquin kit foxes. This species also relies on hearing to detect predators and other threats (Bowles and Francine 1993).

Noise and ground vibrations from the use of heavy equipment during construction could cause San Joaquin kit foxes to temporarily or permanently leave impact areas, and San Joaquin kit foxes could move to areas where they are more susceptible to injury or mortality from predation, vehicular traffic, or other activities. San Joaquin kit foxes displaced from the project area due to disturbance related to construction may increase competition for food and habitat with San Joaquin kit foxes in other areas.

Use of rodenticides would suppress the prey base and could directly or indirectly effect San Joaquin kit foxes through inter- and intra-species competition for the remaining available prey. Use of rodenticides could also lead to secondary poisoning of San Joaquin kit foxes that scavenge carcasses of poisoned rodents. Limiting the use of rodenticides as described in the Project Description section would minimize the risk to San Joaquin kit foxes.

Spillage or leakage of industrial chemicals, fuels, and lubricants could result in fouling or poisoning of San Joaquin kit fox and contamination of their habitat. The Applicant's spill prevention and response plan would minimize or eliminate the risk of poisoning or contaminating the habitat of San Joaquin kit fox.

#### Effects of Operations and Maintenance

The solar arrays could alter San Joaquin kit fox habitat to the extent that it may exclude or reduce the species' use of the 1,794-acre area, which includes the solar array plus an area around the array's footprint. Resulting alterations could include changes from an open grassland habitat to

one with more shading and less long range visibility. San Joaquin kit foxes are known to use, in limited capacity, areas with existing structures, such as orchards, active oil field operations, and the fringes of urban development. San Joaquin kit foxes have also been observed around and under the solar arrays in the California Valley Solar Ranch (H.T. Harvey 2015). Although a habitat corridor exists through the project area, if the panel array areas are not re-inhabited by San Joaquin kit foxes or if the habitat corridor is not used, the San Joaquin kit fox local population would be fragmented and potentially isolated from the rest of the species' range. Fragmenting or isolating populations could lead to increased stress leading to lower reproduction, lower juvenile survival, shorter lifespans, and/or risk of local extinction (Lande 1988; Frankham and Ralls 1998; Saccheri et al. 1998). The perimeter security fencing would be permeable to San Joaquin kit fox and would allow movement through the project site. The habitat corridors and the permeable perimeter fence would reduce the risk of fragmenting and isolating the local population.

The project would result in a change to the current grazing regime from cattle to sheep. Working dogs used by ranchers conducting the grazing and management programs could chase, injure, or kill San Joaquin kit foxes. Alterations to the grazing regime could have an effect on the abundance or distribution of San Joaquin kit foxes. The current intensive cattle grazing within the project area constrains vegetation height, density, and composition, which creates beneficial habitat conditions for the San Joaquin kit fox. The project area within the array footprints would be grazed by sheep or goats during the O&M phase of the project. Any vegetation change resulting from this alteration in the grazing regime could be either beneficial or detrimental to San Joaquin kit fox prey, and fluctuations in prey populations have been shown to affect kit fox densities (White and Ralls 1993, White et al. 1996). However, due to a lack of information regarding the continued long-term use of solar arrays by the San Joaquin kit fox and to be conservative for the species in our analysis, we conclude that the land under the panel arrays would not remain suitable habitat for the species.

The proposed project could also affect movement and dispersal of San Joaquin kit foxes. Although San Joaquin kit foxes are known to move through partially disturbed habitats such as farmlands, oil fields, and areas with low density roads and highways, San Joaquin kit foxes could avoid, to some extent, the areas under and around the arrays due to the density of the panels in the landscape (Haight et al. 2002). The panel arrays would create artificial structure in an otherwise open landscape. The panel arrays could simulate a habitat with more vertical structure than preferred by San Joaquin foxes or create structure that would provide habitat preferred by competitors or predators. As a result, San Joaquin kit foxes may avoid the area under and around the panel arrays. Also, placement of solar arrays and fencing could influence the scent-marking behavior and disrupt territorial boundaries of San Joaquin kit foxes in the proposed project area. If territories shift from the current distribution, interspecific competition and behavior changes could occur.

Vehicles used by operations and maintenance personnel, anticipated to be 50 individuals, could kill or injure San Joaquin kit fox in the project area during their daily commute to the solar generation facility (PVS 2014). Vehicles for maintenance and panel washing could kill or injure San Joaquin kit foxes if the species re-inhabits the panel array areas. Preliminary results at the California Valley Solar Ranch indicate San Joaquin kit fox use of the panel arrays during and

shortly after the construction (H.T. Harvey 2015). Vehicles driven through the array could crush dens. Maintenance and panel washing vehicles could also strike individual San Joaquin kit fox resulting in injury or mortality.

San Joaquin kit foxes could be killed or injured by being hit or run over by nighttime worker traffic or security patrols during project construction or operations and maintenance activities. We anticipate the risk of vehicle strike to continue during the operations and maintenance of the facility; this risk would be greatest during nighttime security patrols. The threat of vehicle strike may be greater for San Joaquin kit foxes that are attempting to re-inhabit the panel arrays, because they would be moving through an unfamiliar landscape. To minimize the risk of vehicle strike, all nighttime traffic would be required to maintain a posted 10 mph speed limit on the project site, and would be required to remain on the existing roads except when emergency response requires vehicle access to off-road areas. However, we anticipate that not all workers will observe the posted speed limit, which could somewhat limit the benefit of this measure.

San Joaquin kit fox populations have been linked to giant kangaroo rat populations (Service 1998; Cypher 2003). Capture and relocation of giant kangaroo rats, a primary prey source for the San Joaquin kit fox, may alter the kit fox's distribution in the solar generation facility area, conservation lands, and the recovery core area. San Joaquin kit foxes may vacate the solar array area in search of prey, resort to a less preferred or optimal prey source, and be subject to reduced fitness that could result in reduced reproduction locally.

#### Effects of Conservation Lands

The project's conservation measures include habitat preservation and management, which would protect suitable and occupied habitat for the San Joaquin kit fox. San Joaquin kit foxes have been observed on all three of the areas proposed by the Applicant to serve as conservation lands. Current land use in the conservation lands is compatible with San Joaquin kit fox persistence and appears to be near optimal conditions for the species. The proposed management actions will protect the conservation lands from incompatible future land uses and maintain an optimal grazing regime for the species. The ultimate effect of conservation of the lands as proposed by the Applicant would be permanent preservation of suitable and occupied habitat from future incompatible land uses. Despite the conservation of existing habitat, the project would still result in a net loss of suitable and occupied habitat for the San Joaquin kit fox and a minor reduction of area available for recovery of the species.

#### Effects on Recovery

The Recovery Plan for Upland Species of the San Joaquin Valley, California (Recovery Plan) addresses recovery goals for the San Joaquin kit fox (Service 1998). The strategy in the Recovery Plan for the San Joaquin kit fox includes the establishment and maintenance of viable complexes of interconnected kit fox populations on private and public lands throughout its geographic ranges (Service 1998). While the proposed project would impact 2,506 acres of occupied or suitable habitat optimal (0 to 6 percent slope in an open landscape) for the San Joaquin kit fox in the Ciervo-Panoche Natural Area, the conservation measures incorporated into the project would result in protection and management of important San Joaquin kit fox habitat.

The proposed project includes the conservation of approximately 10,000 acres of San Joaquin kit fox habitat (0 to 11 percent slope in an open landscape) and measures to maintain habitat connectivity, thus contributing to the recovery goal of establishing and maintaining viable interconnected kit fox populations. The 1,794 acres of permanent impact represent a small portion of the available habitat for the local population and an even smaller portion of available habitat rangewide. While the proposed protection and management of the conservation lands is not expected to result in increased numbers of San Joaquin kit foxes because current land uses on these lands are already near optimal condition for supporting San Joaquin kit fox, the proposed project will contribute to recovery by providing permanent protection of these lands consistent with the recovery plan. The maintenance of the habitat corridors through the solar generation facility will provide permanent protection of habitat that San Joaquin kit foxes can use to disperse to lands south and north of the project site.

### Summary of Effects to San Joaquin Kit Fox

In determining whether a proposed action is likely to jeopardize the continued existence of a species, we consider the effects of the action with respect to the numbers, reproduction, and distribution of the species. The Corps and the project proponent have proposed measures to avoid and minimize impacts to San Joaquin kit fox during project activities.

Based on the conservation measures included in the project description to be implemented by the Corps and the Applicant, we conclude that impacts to the overall population, breeding and reproduction capacity, and recovery of the San Joaquin kit fox due to the Corps' current proposed activities would be minor. Because the Corps and the project proponent would implement the protective measures identified in the Description of the Proposed Action section of this document, we anticipate that few San Joaquin kit fox are likely to be killed or injured during the project.

### *Reproduction*

Due to the large increase in traffic during the projected 18-month construction period, San Joaquin kit foxes would be subject to potential mortality during the breeding season. Reproductive-aged individuals, particularly females, killed during the breeding season would reduce the reproductive success of the local population. We expect the reduction in reproductive success to be a short-term impact. We anticipate the loss of a reproductive individual would be replaced during the next breeding cycle through maturation of juveniles or immigration of new individuals from outside the project area.

To minimize the project's effects on the reproduction of the San Joaquin kit fox during construction, the Applicant proposes to survey for and avoid natal dens in the project footprint. Consequently, we expect the local effect of the proposed project on reproduction of the San Joaquin kit fox to be minimal. Because the effects of the proposed project on the species' reproduction is not expected to be substantial at the local level, we further conclude that the proposed project will not reduce the San Joaquin kit fox's ability to reproduce rangewide.

### *Numbers*

The Applicant has propose measures to avoid injuring or killing individual San Joaquin kit foxes, including pre-construction surveys, avoidance of active dens, and exclusionary measures to prevent direct injury. Some injury or mortality may still occur, especially due to vehicle strikes; however, due to the low density of San Joaquin kit foxes in the project area and the measures proposed to avoid and minimize effects, we expect that few San Joaquin kit foxes would be killed or injured. We do not have an estimate for the rangewide population of the species. The San Joaquin kit fox occupies a geographic range that is large relative to the size of the action area, including portions of most counties surrounding the San Joaquin Valley, and there is a large, stable population in the Carrizo Plain. Implementation of the proposed project is not expected to appreciably reduce the local population of the San Joaquin kit fox. Because the effect on the number of San Joaquin kit foxes at the local level would be minor, we conclude that the proposed action will not appreciably reduce the number of San Joaquin kit foxes rangewide.

### *Distribution*

The local population of the San Joaquin kit fox is expected to shift out of and away from the panel arrays. This would eliminate a portion of habitat in the middle of the Panoche Valley; however, conservation of land to the north and south and the connecting habitat corridor would minimize the effects of the habitat lost to the solar development. The project as proposed would result in some limitations on the movement of San Joaquin kit foxes but is not expected to preclude north and south movements as a habitat corridor would remain through the project. Therefore, although implementation of the proposed project would remove occupied and suitable habitat for the species, we have determined that it will not appreciably reduce the distribution of the species at the local or rangewide level.

### *Recovery*

The project could disrupt normal life history patterns of some individual San Joaquin kit foxes within one of the three core populations for San Joaquin kit fox: the Ciervo-Panoche Natural Area (Service 1998). The proposed project would also permanently remove some occupied, optimal habitat in the Ciervo-Panoche Natural Area. The avoidance, minimization, and conservation measures are expected to reduce these effects to the species in the area and minimize adverse effects to recovery efforts. In particular, the project design incorporates a habitat corridor that allows for more site permeability from north to south and allows for movement between lands conserved as part of the proposed project. The corridor is expected to provide a path of suitable habitat for San Joaquin kit fox occupation and movement through the area which will allow for continued function of the Ciervo-Panoche Natural Area. Based on information from similar solar power projects in the Carrizo Plains, the Service concludes that San Joaquin kit fox can persist, at least in the short term, in and around solar arrays. With the protection of lands to the north and south of the project site and the habitat corridor to through the project footprint, the function of the Ciervo-Panoche Natural Area will be maintained and recovery of the species will not be impeded by the proposed project.

### **Effects of the Proposed Action on Blunt-nosed Leopard Lizard**

Development of the solar arrays and associated infrastructure would result in the temporary and permanent disturbance of 2,506 acres. Construction of the panel arrays, project roads, and telecommunication and powerline infrastructure would result in a permanent loss of 1,794 acres of suitable and/or occupied blunt-nosed leopard lizard habitat. Another 712 acres of suitable and/or occupied blunt-nosed leopard lizard habitat would be temporarily lost. Unless blunt-nosed leopard lizards are able to persist under and around the solar arrays (1,629 acres), the entire 1,794 acres would be lost for movement, dispersal, foraging, and population expansion.

Survey efforts, both at protocol and non-protocol levels, conducted in the solar array portion of the project area have identified blunt-nosed leopard lizard occupation of the site to be concentrated in Las Aguilas and Panoche Creek and along Yturiate Road, and they have been observed in the Valley Floor Conservation Lands (PVS 2014). Areas disturbed by the proposed power line and telecommunication improvements could also provide suitable habitat for blunt-nosed leopard lizards. Protocol surveys have not been completed for the power line and telecommunication improvement portions of the proposed project. The proposed project has been designed to avoid the locations where blunt-nosed leopard lizards have been observed and avoidance measures include establishing a 52.4-acre buffer centered on the single observation of a blunt-nosed leopard lizard in the project footprint. All of these avoided areas are included in the Valley Floor Conservation Lands. The Applicant proposes to conduct a preconstruction survey immediately prior to construction, and conduct monitoring of construction activities in areas potentially occupied by blunt-nosed leopard lizards to avoid effects to the species (PVS 2014). Exclusion fencing installed at the discretion of the designated biologist during construction would prevent those individuals observed from entering the project area. In areas where exclusion fencing is not installed, individual blunt-nosed leopard lizards could enter the project area and would be subject to the effects of project construction described below.

Although survey efforts have identified where blunt-nosed leopard lizards have occurred, we assume that not all individuals may have been observed even at protocol levels due to their cryptic coloration and their fossorial nature (CDFW 2004). Adult blunt-nosed leopard lizards may remain in underground burrows for over 21 months during periods where prey may be low in abundance due to drought conditions (Germano et. al 1994), and California is currently in the fourth consecutive year of drought conditions (Griffin and Anchukaitis 2014). These prolonged drought conditions increase the likelihood that blunt-nosed leopard lizards may be in underground burrows and were therefore not detected during survey efforts. Blunt-nosed leopard lizards also move throughout the landscape and have been recorded moving distances as far as 1,509 feet and may have moved through the landscape and into the project area since the last observation (Tollestrup 1983). The preconstruction surveys may not occur when environmental conditions are suitable for blunt-nosed leopard lizards to be active above ground. We expect some blunt-nosed leopard lizards will remain within the project footprint regardless of the proposed survey effort and would be subject to the effects described below.

### Effects of Project Construction

Solar arrays would be installed in areas that are characteristic of optimal blunt-nosed leopard lizard habitat: open, sparse vegetation, low relief, with a slope less than 11 percent. The area underneath and within shading distance of the array structures may be altered due to changes in vegetation structure and environmental conditions to such an extent that blunt-nosed leopard lizard abundance or use of the area is reduced. This would constitute a loss of suitable habitat for foraging, shelter, and breeding.

Employing underqualified designated monitors could result in adverse effects to blunt-nosed leopard lizards. If designated monitors do not have adequate training to detect blunt-nosed leopard lizards, presence of the species in the area may not be recognized. Any blunt-nosed leopard lizards not correctly identified would be subject to the effects described below. Service review and approval of the designated biologists would ensure that the monitors are appropriately qualified.

Blunt-nosed leopard lizards not detected during surveys or those that have moved into the project area since past survey observations would be subject to injury, mortality, or other adverse effects. Blunt-nosed leopard lizards could be killed or injured by vehicle traffic, heavy equipment, excavation, trenching, and grading during construction activities. The roads created as part of the proposed project could provide suitable basking areas and an open, flat area for foraging for blunt-nosed leopard lizards and cause individuals to move into the construction area and the proposed project. Blunt-nosed leopard lizards that move to project roads would be subject to mortality and injury caused by vehicles during construction. Blunt-nosed leopard lizards are more susceptible to vehicular strikes in cool weather, when they are less active because of low body temperature. Blunt-nosed leopard lizards that remain in the project area and in burrows would be subject to mortality as a result by entombment in burrows that collapse during construction activity.

Large-scale renewable solar energy projects can impact blunt-nosed leopard lizard habitat by altering landscape topography, vegetation, and drainage patterns. They also can reduce habitat quality through interception of solar energy that would normally reach the ground surface, thereby affecting ambient air temperatures through habitat shading and altering soil moisture regimes (Smith 1984; Smith et al. 1987). The proposed project footprint, 1,629 acres of solar arrays, is a large contiguous block of disturbance in undeveloped habitat with unimpeded solar energy reaching the ground. We conclude that the area under the panel arrays would likely be unsuitable for blunt-nosed leopard lizards for the life of the project due to the decrease in solar radiation at the ground and expected change in vegetative structure and density that could reduce the ability of blunt-nosed leopard lizards to move through the area.

Ground disturbance caused by construction activities would disturb suitable and potentially occupied blunt-nosed leopard lizard habitat. Installation of solar panels mounted on metal frames anchored with a low impact pile driver within areas of burrow refugia could result in mortality or injury through direct contact or as a result of burrows being crushed by vehicles or equipment or subject to vibrational collapse. The Applicant has proposed conducting surveys for the species and avoiding areas around observations, which we conclude would reduce but not

eliminate this risk and we expect that some injury or mortality of blunt-nosed leopard lizards may still occur.

The proposed stream crossings would occur across Las Aguilas, which has concentrations of blunted-nosed leopard lizard sightings. Because of the relatively high concentrations of blunt-nosed leopard lizards in these areas, construction of stream crossings have the highest likelihood of causing injury to mortality of individuals. All ground disturbing activities would cause loss of suitable habitat, while direct injury or mortality could be caused by vehicle traffic, heavy equipment of machinery, construction worker foot traffic, and leaks or spills from vehicles or equipment. Noise or vibration from construction activities could cause blunt-nosed leopard lizards to disperse from the area, increasing their risk of predation or competition.

Installation of buried power and communication cables in suitable habitat could directly affect blunt-nosed leopard lizards by creating impassable barriers between burrows and foraging areas. Additionally, blunt-nosed leopard lizards could fall into deep, steep-walled trenches and not be able to escape, where they would be vulnerable to predation, starvation, or entombment. Installing escape ramps in temporary trenches and pits, as proposed by the Applicant, will reduce the risk of injury or mortality to blunt-nosed leopard lizards.

Blunt-nosed leopard lizards may be displaced from work sites and adjacent occupied habitat by human activity and noise associated with construction activities. Displaced individuals could be subject to increased predation and increased inter- and intra-specific competition resulting in decreased fitness and potentially reducing the carrying capacity of surrounding habitat.

Blunt-nosed leopard lizards could be killed or injured due to predation by species such as red fox, coyote, or domestic dogs that are attracted to the area by trash discarded by personnel during construction. The Applicant's plan to regularly remove trash from the project area would eliminate the attractant for other wildlife and reduce the potential for predation on blunt-nosed leopard lizards during construction.

Spillage or leakage of industrial chemicals, fuels, and lubricants could result in fouling or poisoning of blunt-nosed leopard lizards and contamination of their habitat. The Applicant's spill prevention and response plan would minimize or eliminate the risk of poisoning or contaminating the habitat of blunt-nosed leopard lizards.

#### Effects of Operations and Maintenance

Maintenance or repair of buried power and communication cables in suitable habitat could directly affect blunt-nosed leopard lizards by creating impassable barriers between burrows and foraging areas. Additionally, blunt-nosed leopard lizards could fall into deep, steep-walled trenches and not be able to escape, where they would be vulnerable to predation, starvation, or entombment. Installing escape ramps in temporary trenches and pits, as proposed by the Applicant, would reduce the risk of injury or mortality to blunt-nosed leopard lizards.

Vehicles for maintenance, day time security patrols, and panel washing could injure or kill blunt-nosed leopard lizards that may re-inhabit the panel arrays or use the project roads for foraging and basking.

Structures associated with the proposed project, such as the panel arrays and fencing, could provide perches for avian predators that could increase predation rates of blunt-nosed leopard lizards in the project area. Blunt-nosed leopard lizards may avoid areas adjacent to project structures, such as the panel arrays and perimeter fence. Terrestrial species have been known to avoid areas with increased vertical structures that may serve as perches for predators (Schuster et al. 2015).

### Effects of Conservation Lands

The conservation measures, including habitat preservation and management, would protect suitable habitat for blunt-nosed leopard lizards. The Valley Floor Conservation Lands are currently occupied habitat. Blunt-nosed leopard lizards have been observed on the Silver Creek Ranch Conservation Lands but the extent of the species use of the area is unknown. Current land use in the conservation lands is compatible with blunt-nosed leopard lizard persistence. The proposed management actions and enhancements will benefit the blunt-nosed leopard lizard by providing protection from incompatible future land uses and maintaining an optimal grazing regime for the species. Despite the conservation of existing habitat, the project would still result in a net loss of suitable and occupied habitat for the blunt-nosed leopard lizard. The ultimate effect of conservation of the lands as proposed areas as proposed by the Applicant would be permanent preservation of suitable habitat.

### Effects on Recovery

Although the majority of blunt-nosed leopard lizards have been observed in Las Aguilas and Panoche Creeks (both of which transverse the action area and have been included in the Valley Floor Conservation Lands), the entire project site supports suitable habitat for the species. If the habitat under and around the panel arrays changes and becomes unsuitable for blunt-nosed leopard lizards, the species would permanently lose approximately 1,794 acres of suitable habitat. The paths for dispersal would also be limited to Las Aguilas and Panoche Creeks and the other Valley Floor Conservation Lands. The population of the Valley Floor Conservation Lands could be at risk of inbreeding depression and local extinction if the area was to become isolated from other populations. The Valley Floor Conservation Lands provide a corridor which is contiguous with and therefore provides a connection between the other conserved lands to the north and south. This design component of the conservation lands minimizes the risk of population isolation by allowing for movement, dispersal, and genetic flow. While implementation of the proposed project would result in some reduction of suitable habitat in the Panoche Valley, that reduction would be offset through the permanent protection and management of the currently known occupied habitat in the Valley Floor Conservation Lands and approximately 10,000 acres of suitable habitat on the Valadeao and Silver Creek Ranch Conservation Lands, consistent with the recovery goals for this species. We conclude that although effects to individual blunt-nosed leopard lizards would occur and suitable habitat would be lost, the proposed project would not impede the recovery of the species.

The Panoche Valley population of blunt-nosed leopard lizards has unique genetics that indicate relative isolation from other remaining populations of the species (Grimes et al. 2014). The unique genetic composition of the species in the area is important to maintain for recovery of the species. Reduction, fragmentation, or isolation of the local population could remove the individuals of the Panoche Valley population from reproducing and exchanging genes that would increase the chances of survival from disease or other environmental factors from an increase in genetic diversity. However, the preservation and management of the conservation lands is expected to effectively reduce or eliminate the risk of fragmentation and isolation of the local population of the blunt-nosed leopard lizards.

The potential effects of climate change on blunt-nosed leopard lizards are difficult to assess. We have attempted to make inferences through comparisons to the conditions expected to occur to the rangewide population and in particular the subpopulations in the San Joaquin Valley (B. Sinervo, pers. comm.). The Panoche Valley currently has lower average temperatures than the San Joaquin Valley. The average projected increase in temperature due to climate change is expected to maintain suitable temperatures within the Panoche Valley for blunt-nosed leopard lizards whereas the majority of the San Joaquin Valley may become too warm. This minor shift in temperature of the Panoche Valley would make it a refuge from climate change in the next century. Removal of suitable habitat in the area of a refuge from climate change could adversely affect recovery efforts by reducing the overall amount of habitat available for the species. However, the permanent impacts from implementation of the project would represent only a portion of the suitable habitat in the area for the species. The preservation and management of the conservation lands would provide suitable habitat in the Panoche Valley area for the species to inhabit and are expected to minimize the risk of impacts from climate change by providing habitat for blunt-nosed leopard lizards, in perpetuity.

#### Summary of Effects to Blunt-nosed Leopard Lizards

In determining whether a proposed action is likely to jeopardize the continued existence of a species, we consider the effects of the action with respect to the numbers, reproduction, and distribution of the species and the impacts on recovery. The Corps and the project proponent have proposed measures to avoid and minimize impacts to blunt-nosed leopard lizards during project activities.

#### *Reproduction*

The highest densities of blunt-nosed leopard lizards in the action area are located near Panoche and Las Aguilas Creeks, where effects to the habitat would be minimal due to the establishment of the Valley Floor Conservation Lands that include both creeks and adjacent lands. The Valley Floor Conservation Lands will provide foraging, movement, and dispersal habitat that would allow for intraspecies interaction and genetic flow in the local and regional populations. While we expect some blunt-nosed leopard lizards to be killed or injured during project activities (e.g., grading, installation of solar panels), the Applicant has proposed measures to minimize these effects, such as pre-activity surveys, avoidance of occupied areas, and covering open trenches. Assuming the loss of individuals translates into lower reproductive capacity, we expect that if any blunt-nosed leopard lizard are killed or injured, their contribution to the season's breeding

effort would be lost; however, because we expect the Applicant's avoidance and minimization measures will reduce such losses, we further conclude that the effect on reproduction in the action area will be small and temporary. This small effect at the local level means that the proposed action would not reduce the reproduction of the species on a rangewide scale.

### *Numbers*

As noted above, we expect that individual blunt-nosed leopard lizards would be killed or injured by the proposed activities; however, we have further determined that implementation of the proposed avoidance, minimization, and conservation measures will reduce the potential for such losses to occur. This means that the number of blunt-nosed leopard lizards may be slightly reduced at the project level, but rangewide, the effect would be negligible. We conclude that the proposed action would not reduce the number of blunt-nosed leopard lizards on a rangewide scale.

### *Distribution*

The proposed project would remove suitable and occupied habitat for the species, and the local population is expected to shift out of and away from the panel arrays. The majority of the occupied areas with the highest densities of blunt-nosed leopard lizard would be avoided by the proposed project design. The project as proposed would result in some limitations on movement of blunt-nosed leopard lizards due to removal of habitat on the Panoche Valley floor, but the species will continue to occupy the habitat of the Valley Floor Conservation Lands, which include Panoche and Las Aguilas Creeks, to move and disperse throughout the area. Because most of the local distribution will remain intact, especially where densities of the blunt-nosed leopard lizard are highest, we conclude that the proposed project will not reduce the species' distribution on a rangewide scale.

### *Recovery*

The proposed project would permanently remove suitable and potentially occupied habitat for the blunt-nosed leopard lizard in the Ciervo-Panoche Natural Area. The avoidance, minimization, and conservation measures are expected to reduce effects to the species in the area and minimize adverse effects to recovery efforts. The conservation lands are expected to provide suitable habitat for blunt-nosed leopard lizard occupation and movement through the area and allow for continued function of the Ciervo-Panoche Natural Area as important habitat for the blunt-nosed leopard lizard. We conclude that the proposed action would not impede the species' recovery.

## **Effects of the Proposed Action on California Tiger Salamanders**

Development of the solar arrays and associated infrastructure, including project road, and telecommunication and powerline infrastructure, will result in the temporary and permanent disturbance of 2,506 acres. The project area contains at least one known breeding pond for California tiger salamanders. Approximately 1,500 acres of the project area are within dispersal distance of known California tiger salamander breeding ponds and contain numerous small

mammal burrows that could provide suitable refugia. All known occupied ponds on the project site are included in the Valley Floor Conservation Lands and will not be directly affected by the proposed project construction. We are not aware of any scientific literature on the effects of solar arrays on California tiger salamanders. The potential for this species to re-inhabit the land under panel arrays after installation exists, but is unlikely as the project is not compatible with standing water where breeding could occur. Some California tiger salamanders may be present in the project area during dispersal events to or from breeding ponds.

The Applicant proposes to excavate burrows to capture and relocate California tiger salamanders in portions of the solar generation site that are in proximity (a minimum of 3,281 feet) to known breeding ponds as detailed in the California Tiger Salamander Pre-construction Avoidance and Minimization Plan. While capture and relocation of California tiger salamanders is expected to reduce the number of California salamanders that could be killed or injured by project construction activities, capture and relocation could result in the injury or death of individual California tiger salamanders. The Applicant proposes to reduce the risk of injury or death by using Service-approved biologists, by limiting the duration of handling, and requiring the proper transport of these species. Although survivorship for translocated California tiger salamanders has not been estimated, survivorship of translocated wildlife, in general, is reduced due to intraspecific competition, lack of familiarity with the location of potential breeding, feeding, and sheltering habitats, and increased risk of predation. However, California tiger salamanders tend to be relatively sedentary when aestivating in upland habitat. By relocating captured salamanders to suitable upland refugia, we expect the survivorship of these individuals to be relatively high.

Observations of diseased and parasite-infected amphibians are now frequently reported. Releasing amphibians following a period of captivity, during which time they can be exposed to infections, may cause an increased risk of mortality in wild populations. Amphibian pathogens and parasites can also be carried between habitats on the hands, footwear, or equipment of fieldworkers, which can spread them to localities containing species which have had little or no prior contact with such pathogens or parasites. Chytrid fungus is a water-borne fungus that can be spread through direct contact between aquatic animals and by a spore that can move short distances through the water. The fungus only attacks the parts of an animal's skin that have keratin (thickened skin), such as the mouthparts of tadpoles and the tougher parts of adults' skin, such as the toes. It can decimate amphibian populations, causing fungal dermatitis, which usually results in death in 1 to 2 weeks. Infected animals may spread the fungal spores to other ponds and streams before they die. Once a pond has become infected with chytrid fungus, the fungus stays in the water for an undetermined amount of time. Relocation of individuals captured from the project area could contribute to the spread of chytrid fungus. In addition, infected equipment or footwear could introduce chytrid fungus into areas where it did not previously occur. Using proper precautions, such as the Applicant's commitment to using the Declining Amphibian Populations Task Force protocol to avoid spreading infection from location to location, constitute the best practices available to reduce or eliminate risk to the species.

### Effects of Project Construction

Solar arrays would be installed in areas occupied by a large population of rodents and small mammals that provide suitable burrows for California tiger salamanders. The area underneath and within shading distance of the array structures may be altered due to changes in vegetation structure and environmental conditions to such an extent that rodent and small mammal abundance or use is reduced. This would constitute a loss of suitable refugia habitat for California tiger salamanders.

Employing underqualified monitors could result in adverse effects to California tiger salamanders. If designated monitors do not have adequate training to detect California tiger salamanders, presence of the species in the area may not be recognized. Any California tiger salamanders not correctly identified would be subject to the effects described below. Service review and approval of the designated biologists would ensure that the monitors are appropriately qualified.

California tiger salamanders that occur in or within dispersal distance of the project area could be adversely affected by project activities. Injury or mortality could occur when individuals are crushed by earth-moving equipment, debris, and worker foot traffic. Work activities, including resultant noise and vibration, could cause California tiger salamanders to leave or avoid suitable habitat. This disturbance and displacement may increase the potential for predation, desiccation, competition for food and shelter, or strike by vehicles on roadways. Individuals remaining in burrows may be killed or injured by the large machinery used to dig trenches; by project grading activities; or they may become trapped and die if the entrance to their upland sheltering habitat is crushed or covered.

During periods of rainfall (typically greater than 0.5 inch of rain in a 24-hour period), we expect a higher likelihood of California tiger salamanders dispersing above ground towards or away from breeding ponds in the project vicinity. Any amphibians moving through the project site would be at risk of injury or death caused by vehicles, equipment, or workers. Exclusion fencing, installed at the discretion of the designated biologist around areas of project construction and ground disturbance, would reduce the risk of adverse effects to California tiger salamanders. However, areas where exclusion fencing is not installed, would allow California tiger salamanders to move through the project site. These individuals would be subject to adverse effects from project construction.

Trash left during or after project activities could attract predators to work sites, which could, in turn, prey on California tiger salamanders. For example, raccoons (*Procyon lotor*) and feral cats (*Felis catus*) are attracted to trash and also prey opportunistically on California tiger salamanders. This potential impact would be reduced or avoided by careful control of waste products at all work sites, as proposed by the Applicant.

Uninformed workers could disturb, injure, or kill California tiger salamanders. The potential for this to occur would be reduced by educating workers on the presence and protected status of this species as proposed by the Applicant and the additional measures that will be implemented to protect California tiger salamanders during project activities by the designated biologist. The use

of flagging and fencing around environmentally sensitive areas, as proposed by the Applicant, would also reduce these potential impacts by preventing workers from encroaching into adjacent habitat.

Spillage or leakage of industrial chemicals, fuels, and lubricants could result in fouling or poisoning of California tiger salamanders and contamination of their habitat. The Applicant's spill prevention and response plan would minimize or eliminate the risk of poisoning or contaminating the habitat of California tiger salamanders.

#### Effects of Operations and Maintenance

Vehicles for maintenance and panel washing could destroy or damage California tiger salamander habitat if the species re-inhabits the panel arrays. Vehicles driven through areas with burrows could crush burrows and disrupt movement paths. Vehicles could also crush individual California tiger salamanders or entomb individuals in burrows as a result of soil compaction.

California tiger salamanders could be killed or injured by being hit or run over by nighttime worker traffic or security patrols during operations and maintenance activities. This risk would be greatest during or after rainfall when individuals may be moving through the project area towards or away from breeding ponds. All nighttime traffic will be required to maintain a posted 10 mph speed limit on the project site, and will be required to remain on the existing roads except when emergency response requires vehicle access to off-road areas which will reduce the risk of vehicle strikes on California tiger salamanders. However, we anticipate that not all workers will observe the posted speed limit, which could somewhat limit the benefit of this measure.

Maintenance or repair of buried power and communication cables in suitable habitat could directly affect California tiger salamanders through direct mortality from ground disturbance, destroying occupied burrows, and creating impassable barriers between burrows and foraging areas. Additionally, California tiger salamanders could fall into deep, steep-walled trenches and not be able to escape, where they would be vulnerable to predation, starvation, or entombment. Installing escape ramps in temporary trenches and pits, as proposed by the Applicant, would reduce the risk of injury or mortality to California tiger salamanders.

#### Effects of Conservation Lands

The conservation measures including habitat preservation and management would protect suitable habitat for California tiger salamanders. The Valley Floor Conservation Lands and Valadeao Ranch Conservation Lands are currently occupied habitat. The Applicant proposes to create three additional breeding ponds on the Valadeao Conservation Lands. Current land use in the conservation lands is compatible with California tiger salamander persistence, and the proposed management actions and enhancements are expected to provide a benefit to the species. Management for the species, particularly breeding ponds, will benefit the species at a local, regional, and rangewide scale. While the project would result in a net loss of suitable habitat for the species, with the creation of additional breeding ponds, we expect the local population to increase or remain stable.

### Effects on Recovery

We have not developed a recovery plan for the California tiger salamander to which we can refer to assess its recovery status. In the absence of a recovery plan, we default to standard conservation practices for this and most other amphibian species. Recovery goals would focus on the preservation of much of the remaining habitat that supports the species. In general terms, where suitable habitat exists, it should be conserved and where possible, additional habitat should be created or restored. Because of the preservation of existing habitat, creation of breeding habitat, and upland habitat enhancement activities included in Habitat Management Plan, project implementation should result in few, if any, long-term effects to the species or to its recovery.

Relocation of the individuals not tested for non-native genes could spread non-native alleles to other locations occupied by previously unaffected native populations. This would reduce the overall California tiger salamander survivorship through hybrid breeding. Although genetic analysis has not been performed for the local population of California tiger salamanders, the isolated nature of the Panoche Valley suggests that individuals have not been exposed to nonnative genes and hybridization. The loss of native genetics would adversely affect recovery of the California tiger salamander, but we expect the potential for such effects to be low because we expect the few individuals will be lost and prevented from reproduction. The creation of additional breeding ponds is expected to increase the local population and preserve the current genetic structure.

In addition to avoiding known breeding ponds and incorporating them into the conservation lands, the Applicant will create additional breeding ponds. Also, individual California tiger salamanders located in upland refugia will be captured and relocated. We believe that only a few, if any, individuals will be lost due to project activities. The effects to recovery of local, regional and rangewide populations of California tiger salamanders are expected to be negligible.

### Summary of Effects to California Tiger Salamanders

In determining whether a proposed action is likely to jeopardize the continued existence of a species, we consider the effects of the action with respect to the numbers, reproduction, and distribution of the species and the impacts on recovery. The Corps and the Applicant have proposed measures to avoid and minimize impacts to California tiger salamanders during project activities, identified in the Description of the Proposed Action section of this document, such that we anticipate that few, if any, California tiger salamanders are likely to be killed or injured during the project construction or operation and maintenance.

In summary, the proposed action could adversely affect California tiger salamanders due to the loss of dispersal and aestivation habitat; however, the Corps and the project proponent have proposed avoidance and minimization measures to reduce these impacts, including capture and relocating individuals from the project area and creation of additional breeding ponds. Based on these measures, we anticipate that the impacts to California tiger salamanders will be low during project implementation.

### *Reproduction*

We have determined that implementation of the proposed project would not reduce the ability of the California tiger salamander to continue to successfully breed within the action area. This conclusion is based on the Applicant's proposal to avoid direct impacts to the breeding ponds located in the project area and the proposed creation of breeding ponds in adjacent conservation lands. Some individual California tiger salamanders may be killed or injured during dispersal or while aestivating in burrows, and the loss of reproductive individuals may translate into lower reproductive capacity for the local population; however, we expect such numbers to be low due to measures the Applicant has proposed to protect individual California tiger salamanders, such as pre-activity surveys, capture/relocation efforts, and closing of open trenches. Therefore, we conclude that the likely minimal loss of individual California tiger salamander and the measures proposed to protect breeding by the species and adjacent upland habitat mean that the proposed action will not reduce the reproduction of the California tiger salamander rangewide.

### *Numbers*

A few individual California tiger salamanders are expected to be lost during capture and relocation efforts; however, we have determined that implementation of the proposed project would not reduce the local or rangewide population of the California tiger salamander. We anticipate that a small number of individuals may occur between the proposed 1.2 mile dispersal survey distance and the 1.3 mile known dispersal distance used by the Service. These individuals would be subject to injury or mortality due to construction activities. The avoidance, minimization, and conservation measures would reduce the potential adverse effects to the California tiger salamander and minimize the number lost during project activities. Because the number of individuals that would be killed or injured is likely to be low at the project site, we conclude that any loss of individual California tiger salamanders would be negligible at the rangewide scale.

### *Distribution*

Although implementation of the proposed project would remove suitable and likely occupied upland habitat for the species, we have determined that it will not appreciably affect the distribution of the species at the local, regional or rangewide levels. The California tiger salamander occupies a relatively large geographic ranges outside the action area. The Central California DPS of the California tiger salamander occupies portions of the San Joaquin Valley and coastal Counties in central California. The local population is expected to shift out of and away from the solar panel arrays and the creation of three additional breeding ponds will result in additional breeding habitat and likely a minor shift in the local distribution of the species. We expect these shifts in distribution to be minor at the local level, and we conclude that any change in distribution at the local level would not reduce the distribution of the species rangewide.

### *Recovery*

The proposed project would permanently remove suitable dispersal and likely occupied upland habitat for the species. The avoidance, minimization, and conservation measures proposed by

the Applicant, including capture and relocation and avoidance of known breeding ponds are expected to effectively reduce effects to the species in the area and should, in turn, minimize any effects on the species' recovery. In addition, the conservation lands provide suitable habitat for California tiger salamanders and the creation of breeding ponds will help recovery efforts by preserving known breeding habitat and creating new opportunities for reproduction. The creation of new habitat for the California tiger salamander is consistent with typical recovery goals for a species declining, in part, due to habitat loss. We conclude that the proposed action will not impede the recovery of the California tiger salamander.

### **Summary of Effects of the Conservation Lands**

The entire Action Area is within the Ciervo-Panoche Natural Area (Service 1998). The Service listed the Ciervo-Panoche Natural Area as Priority Level 1 in the Recovery Plan (Service 1998). The Priority Level 1 designation means that action must be taken within the Ciervo-Panoche Natural Area to prevent extinction or to prevent a species from declining irreversibly in the foreseeable future. The Service outlined the steps to achieve this goal through protection of natural lands from development through acquisition of fee title or easements from willing sellers and ensuring that traditional rangeland uses continue while monitoring and protecting vulnerable plant and insect populations. The development of the solar power facility in the Ciervo-Panoche Natural Area does not further this goal. However, the inclusion in the proposed action of permanent protection and management of the conservation lands for the benefit of federally listed species in the area is consistent with the Priority Level 1 designation for the Ciervo-Panoche Natural Area. The conservation lands are currently managed for free range cattle grazing. This land use has provided near optimal habitat conditions for giant kangaroo rats, San Joaquin kit foxes, blunt-nosed leopard lizards, and California tiger salamanders. The enhancement proposed for the conservation lands is expected to maintain or minimally increase the numbers of giant kangaroo rats, San Joaquin kit foxes, and blunt-nosed leopard lizards, and result in an increase in the number of California tiger salamanders through the creation of new breeding habitat. The permanent protection from future development of these habitat lands and specific management of the lands for these species will further recovery efforts.

The conservation lands provide a mix in habitat quality for the species included in this consultation. The Valley Floor Conservation Lands area (2,514 acres) is occupied and used by giant kangaroo rats, San Joaquin kit foxes, blunt-nosed leopard lizards, and California tiger salamanders. This land is interspersed with the proposed project footprint and will be protected from development. The Valley Floor Conservation Lands also provide project footprint permeability and a corridor for movement from the conservation lands to the south and north. This corridor is designed to allow individuals of the species and their ecological associates to move and disperse throughout the Ciervo-Panoche Natural Area and maintain the function of the core area.

The Valadeao Ranch Conservation Lands (10,772 acres) are sparsely occupied by giant kangaroo rats and blunt-nosed leopard lizards. San Joaquin kit foxes were found to use the area of the Valadeao Ranch Conservation Lands known as Little Panoche Valley (PVS 2014). Approximately 2,945 acres of Valadeao Ranch Conservation Lands are between 0 and 11 percent slope which is considered optimal habitat for those three species. The 2,945 acres is an

overestimate of the actual habitat available for the species because this calculation is based entirely on slope and did not account for small or isolated areas of slope surrounded by steep slopes.

The Silver Creek Ranch Conservation Lands (10,890 acres) are occupied by giant kangaroo rats, San Joaquin kit foxes, and blunt-nosed leopard lizards. Approximately 5,765 acres of Silver Creek Ranch Conservation Lands are between 0 and 11 percent slope which is considered optimal habitat for those three species. The 5,765 acres is an over estimate of the actual habitat available for the species because this calculation is based entirely on slope and did not account for small or isolated areas of slope surrounded by steep slopes. The Silver Creek Ranch is specifically identified in the Recovery Plan for Upland Species of the San Joaquin Valley (Service 1998) as an area with high habitat value for the special status species. The recovery plan, in reference to giant kangaroo rats, also has a goal to “protect all existing natural land on the Silver Creek Ranch ...” (Service 1998). In reference to the blunt-nosed leopard lizard, the Recovery Plan aims to “protect additional habitat for them in key portions of their range; areas of highest priority to target for protection are ... Natural lands in the Panoche Valley area of Silver Creek Ranch, San Benito County” (Service 1998). By preserving the Silver Creek Conservation Lands, the proposed action would preserve a “highest priority” area identified in the recovery Plan for these listed species that is currently unprotected.

The value of the conservation lands could be reduced if subsurface mineral rights are exercised. Based on a minerals estate map, approximately 34 percent of the conservation lands have Federal subsurface mineral rights. The remaining 66 percent is a mix of the surface owner (who would be the project proponent) and other private individuals. If the mineral rights are exercised, the associated impacts to the surface and occupied or suitable habitat would be affected. This potential is an unknown and based on the typical BLM practice of a 10 percent surface disturbance, this would reduce the potential surface impacts from mineral extraction to 5 percent of the total area. If those mineral extraction projects were to proceed, they would be subject to consultation with the Service for effects to listed species.

Despite the potential for mineral rights being exercised, we conclude that the conservation lands and their permanent protection and management will provide a benefit to the recovery of listed species.

## CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. We do not consider future Federal actions that are unrelated to the proposed action in this section because they require separate consultation pursuant to section 7 of the Act. We are unaware of any non-Federal actions that are reasonably certain to occur in the action area that would adversely affect the giant kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander. The area has been and continues to be used primarily for free-range ranching activities, which are part of the environmental baseline. The area is located in a relatively remote part of California with limited water availability rendering future development unlikely.

## CONCLUSIONS

The regulatory definition of “to jeopardize the continued existence of the species” focuses on assessing the effects of the proposed action on the reproduction, numbers, and distribution of the species, and their effects on the survival and recovery of the species. For that reason, we have focused our analysis of the effects of the proposed action on the reproduction, numbers, and distribution of the giant kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander to assess the overall effect of the proposed action on the species. We also consider the effect of the action on the recovery of the species.

### **Giant Kangaroo Rat**

#### *Reproduction*

In addition to avoiding areas known to have concentrations of giant kangaroo rats, surveys would be conducted prior to the initiation of construction activities, all giant kangaroo rats found within construction areas would be captured and relocated outside of areas of ground disturbance, and exclusion fencing would be erected to prevent re-occupancy of the areas during construction. If capture and relocation activities occur during mating season, those individual giant kangaroo rats captured and relocated to burrows with inclusion fencing (to prevent immediate dispersal) would be removed from reproduction for the year. If any lactating females are captured during relocation efforts, the female would be returned to the burrow until the young have matured to be on their own. Burrows with young present would not be excavated. Capture and relocation efforts are generally effective but can result in temporary effects to reproduction of the local population from the disruption of normal behavioral patterns that may result in lower reproduction rates. We do not expect implementation of the proposed project to affect overall reproduction of the giant kangaroo rat in the action area because the individuals that may be captured and relocated only represent a portion of the individuals in the local population and a smaller portion of the regional and rangewide populations. We expect any disruption of reproduction to be recovered during the next breeding cycle. At the species level, the minor, temporary effect to the local reproduction of the giant kangaroo rat likely to result from the proposed action would not appreciably affect rangewide reproduction.

#### *Numbers*

Any reduction in the population of giant kangaroo rats as a result of the proposed action is expected to be minimal, and any individuals lost would likely be replaced during the next normal breeding cycle so that such losses would be temporary. The capture and relocation efforts, and other minimization and avoidance measures, are expected to effectively reduce the potential loss of individuals that would otherwise be killed or injured by construction activities and vehicles. Mortality of a few individuals is expected as a result of capture and relocation efforts. We estimate this at 2 percent of the estimated total captures (521) or 11 individuals. The relocated individuals would be provided with a food source that would not only increase the likelihood that they will remain in the new burrow, but also increase the likelihood that they will survive and reproduce during the next breeding cycle. The potential loss of individual giant kangaroo rats would be minor to the local metapopulation, regional metapopulations, and to the rangewide

status of the species. We conclude that while some individual giant kangaroo rats may be killed or injured, the numbers rangewide will not be appreciably reduced; the anticipated losses are minimal and likely to only have a temporary effect.

### *Distribution*

The local distribution of the species would be altered due to the removal of occupied habitat and suitable habitat for local range expansion. Also, relocated individuals would change the distribution if relocated to an area not currently occupied or increase the density of the area if relocated to an inactive burrow system in an occupied area. However, while distribution of the local population would be altered, local distribution would not be significantly reduced, and linkages between the local and rangewide metapopulations are expected to be maintained through the establishment of the Valley Floor Conservation Lands. We conclude that despite local changes to the species' occurrences, the proposed action would not appreciably reduce the rangewide distribution of the giant kangaroo rat.

### *Recovery*

The removal of occupied and suitable habitat would reduce the overall area of potential population and meta-population expansion in the Ciervo-Panoche Natural Area. It could also reduce protection against stochastic events that require large areas to allow the species to redistribute across the landscape during or after an event. The capture and relocation of giant kangaroo rats could alter the genetic structure of the metapopulations in the Ciervo-Panoche Natural area through introduction of individuals to areas of different genetic diversity. To offset these impacts, the proposed project includes conservation of the Silver Creek Conservation Lands to provide permanent protection and management of a large area identified in the Recovery Plan as important for recovery of the species (Service 1998) and establishment of the Valley Floor Conservation Land to permanently protect linkages between the local and rangewide metapopulations of giant kangaroo rat. Although some occupied and suitable habitat would be removed and mortality of a few individuals is expected, we conclude that implementation of the proposed project is expected to have a minimal effect on recovery of the species due to preservation of occupied habitat in the conservation lands and minimizing mortality of individuals through the capture and relocation efforts.

### Conclusion for Giant Kangaroo Rat

After reviewing the current status of the giant kangaroo rat, the environmental baseline for the action area, the effects of the proposed Panoche Valley Solar Farm and the cumulative effects, it is the Service's biological opinion that the Panoche Valley Solar Farm, as proposed, is not likely to jeopardize the continued existence of the giant kangaroo rat. Because we do not anticipate an appreciable decline in giant kangaroo rats within the action area, the proposed action will not appreciably reduce the likelihood of the species' survival and recovery in the wild. The effects on reproduction and numbers of individuals are expected to be minimal and offset during subsequent breeding cycles, the metapopulation distribution would shift but the rangewide distribution would only be slightly altered, and the effects on recovery are expected to be

minimal due to the preservation and management of important habitat specifically for the species consistent with recovery efforts.

### **San Joaquin kit fox**

#### *Reproduction*

To minimize the project's effects on the reproduction of San Joaquin kit fox, the Applicant proposes to survey for and avoid natal dens in the project footprint. These actions should effectively reduce any project related impacts to the species; consequently, we expect the local effect of the proposed project on reproduction of the San Joaquin kit fox to be minimal. Because the effects of the proposed project on the species' reproduction are expected to be minimal at the local level, we conclude that the proposed project will not appreciably reduce the San Joaquin kit fox's ability to reproduce rangewide.

#### *Numbers*

The Applicant proposes numerous measures to avoid injuring or killing individual San Joaquin kit foxes, including pre-construction surveys, avoidance of active dens, and exclusionary measures to prevent direct injury. Some injury or mortality may still occur, especially due to vehicle strikes; however, due to the low number of San Joaquin kit foxes in the project area and the measures proposed to avoid and minimize effects, we expect that few San Joaquin kit foxes would be killed or injured. Therefore, we have determined that implementation of the proposed project is not expected to appreciably reduce local population of the San Joaquin kit fox. Because the effect on the number of San Joaquin kit foxes at the local level would be minor, we conclude that the proposed action will not appreciably reduce the number of San Joaquin kit foxes rangewide.

#### *Distribution*

The local population of the San Joaquin kit fox is expected to shift out of and away from the panel arrays. This would eliminate a portion of habitat in the middle of the Panoche Valley; however, conservation of land to the north and south and the connecting habitat corridor would minimize the effects of the loss that habitat. The project as proposed would result in some limitations on movement of San Joaquin kit fox but is not expected to impede north and south movements as the habitat corridor would remain through the project. Therefore, although implementation of the proposed project would remove some occupied and suitable habitat for the species, we conclude that it will not appreciably reduce the distribution of the species at the local or rangewide level.

#### *Recovery*

The proposed project would permanently remove some occupied, optimal habitat in the Ciervo-Panoche Natural Area. The project could disrupt normal life history patterns of some individuals in one of the three core populations for San Joaquin kit fox (Service 1998). The avoidance, minimization, and conservation measures incorporated into the proposed project are expected to

reduce effects to the species in the area and minimize any adverse effects to recovery efforts. The conservation measures would result in protection and management of important San Joaquin kit fox habitat. The project design incorporates a habitat corridor that allows for more site permeability from north to south and allows for movement between conserved lands. The corridor will provide a path of suitable habitat for San Joaquin kit fox occupation and movement through the area and allow for continued functionality of the Ciervo-Panoche Natural Area. Based in part on information from similar solar power projects in the Carrizo Plains, the Service concludes that San Joaquin kit foxes can persist, in some capacity, in and around solar arrays. With the protection of lands to the north and south of the project site and the habitat corridor to through the project footprint, the function of the Ciervo-Panoche Natural Area will be maintained as an important recovery area for San Joaquin kit fox and the proposed project will not impede recovery of the species rangewide.

### Conclusion for San Joaquin Kit Fox

After reviewing the current status of the San Joaquin kit fox, the environmental baseline for the action area, the effects of the proposed Panoche Valley Solar Farm and the cumulative effects, it is the Service's biological opinion that the Panoche Valley Solar Farm, as proposed, is not likely to jeopardize the continued existence of the San Joaquin kit fox. Because we do not anticipate an appreciable decline in San Joaquin kit foxes within the action area, we also do not believe that the proposed action will appreciably reduce the likelihood of the species' survival and recovery in the wild. The action area represents a small percentage of the known population so that the minor effects we expect due to the proposed action are not likely to appreciably reduce the numbers, reproduction, or distribution of the species or impede its rangewide recovery.

### **Blunt-nosed leopard lizard**

#### *Reproduction*

The highest densities of blunt-nosed leopard lizards in the action area are located near Panoche and Las Aguilas Creeks, where effects to the habitat would be minimal because the areas are avoided and will be preserved as undisturbed, contiguous habitat. While we expect some blunt-nosed leopard lizards to be killed or injured during project activities (e.g., grading, installation of solar panels), the Applicant has proposed measures to minimize these effects, such a pre-activity surveys, avoidance of occupied areas, and covering open trenches. Assuming the loss of some individuals translates into lower reproductive capacity, we expect that if any blunt-nosed leopard lizard are killed or injured, their contribution to the season's breeding effort would be lost; however, because we expect the Applicant's avoidance and minimization measures will minimize such losses, we further conclude that the effect on reproduction in the action area will be small. The small effect on reproduction at the local level would not appreciably reduce the reproduction of the species rangewide.

#### *Numbers*

As noted above, we expect that individual blunt-nosed leopard lizards would be killed or injured by the proposed activities; however, implementation of the proposed avoidance, minimization,

and conservation measures will minimize any such losses. While the number of blunt-nosed leopard lizards may be slightly reduced at the local level, rangewide the effect would be negligible. We conclude that the proposed action would not appreciably reduce the numbers of blunt-nosed leopard lizards rangewide.

### *Distribution*

The proposed project would remove some suitable and potentially occupied habitat for the species, and the local population is expected to shift out of and away from the panel arrays; however, the majority of the occupied areas with the highest densities of blunt-nosed leopard lizard would be avoided by the proposed project design. The project as proposed would result in some limitations on movement of blunt-nosed leopard lizards due to removal of habitat within the project footprint on the Panoche Valley floor, but the species will continue to occupy and disperse through the habitat of the Valley Floor Conservation Lands. Because most of the local distribution will remain intact, especially where densities of the blunt-nosed leopard lizard are highest, we conclude that the proposed project will not appreciably reduce the species' distribution rangewide.

### *Recovery*

The proposed project would permanently remove some suitable and potentially occupied habitat for the blunt-nosed leopard lizard in the Ciervo-Panoche Natural Area. The avoidance, minimization, and conservation measures incorporated into the proposed project are expected to reduce effects to the species in the action area and minimize any adverse effects to recovery efforts. The conservation lands will provide suitable habitat for blunt-nosed leopard lizard occupation and movement through the area and allow for continued functionality of the Ciervo-Panoche Natural Area as important habitat for the blunt-nosed leopard lizard. We conclude that the proposed action would not impede the rangewide recovery of the blunt-nosed leopard lizard.

### Conclusion for the Blunt-nosed Leopard Lizard

After reviewing the current status of the blunt-nosed leopard lizard, the environmental baseline for the action area, the effects of the proposed Panoche Valley Solar Farm and the cumulative effects, it is the Service's biological opinion that the Panoche Valley Solar Farm, as proposed, is not likely to jeopardize the continued existence of the blunt-nosed leopard lizard. Because the effects on reproduction, numbers and distribution of individuals at the local level are expected to be minimal, the rangewide reproduction, numbers and distribution will not be appreciably altered, and the effects to recovery are expected to be minimal due to preservation and management of lands specifically for conservation of the species. The effects to blunt-nosed leopard lizards at the local level will be minor and the project will not appreciably diminish the likelihood of the blunt-nosed leopard lizard's survival and recovery rangewide.

## **California tiger salamander**

### *Reproduction*

We have determined that implementation of the proposed project would not reduce the ability of the California tiger salamander to continue to successfully breed within the action area. This conclusion is based on the Applicant's proposal to avoid direct impacts to the existing breeding ponds located in the project area and the proposed creation of three new breeding ponds in adjacent conservation lands. Some individual California tiger salamanders may be killed or injured during dispersal or while aestivating in burrows, and the loss of reproductive individuals may translate into lower reproductive capacity for the local population; however, we expect such numbers to be low due to measures the Applicant has proposed to protect individual California tiger salamanders, such as pre-activity surveys, capture/relocation efforts, and closing of open trenches. The proposed project will likely result in minimal loss of individual California tiger salamanders and will benefit reproduction of this species through the inclusion of measures to enhance and protect breeding by the species. Therefore, we conclude that the proposed project will not appreciably reduce the reproduction of the California tiger salamander rangewide.

### *Numbers*

A few individual California tiger salamanders are expected to be lost during capture and relocation efforts. However, the numerous avoidance, minimization, and conservation measures incorporated into the project will minimize the number lost as a result of capture and relocation efforts and other project activities. The creation of three breeding ponds on the conservation lands would likely increase the number of individuals in the action area. The minor loss of individuals expected to occur under the proposed project would not appreciably reduce the local or rangewide population of the California tiger salamander.

### *Distribution*

Although implementation of the proposed project would remove some suitable and likely occupied upland habitat for the species, this habitat loss will not appreciably affect the distribution of the species at the local level. The creation of three breeding ponds will result in a net increase in breeding habitat for the species at the local level. The local population is expected to shift out of and away from the solar panel arrays and the creation of additional breeding ponds would likely create a minor shift in the local distribution of the species. We expect these shifts in distribution to be minor at the project level, and we conclude that any change in distribution at the local level would not appreciably reduce the distribution of the species rangewide.

### *Recovery*

The proposed project would permanently remove some suitable and likely occupied upland habitat for the species. The avoidance, minimization, and conservation measures built into the project are expected to reduce effects to the species in the area and minimize any adverse effects to recovery efforts. The conservation lands are expected to provide suitable habitat for California tiger salamanders and the creation of breeding ponds will assist with recovery efforts.

The creation of new habitat for the California tiger salamander is consistent with recovery goals and objectives for a species declining, in part, due to habitat loss. We conclude that the proposed action will not impede the California tiger salamander's recovery.

#### Conclusion for the California Tiger Salamander

After reviewing the current status of the California tiger salamander, the environmental baseline for the action area, the effects of the proposed Panoche Valley Solar Farm and the cumulative effects, it is the Service's biological opinion that the Panoche Valley Solar Farm, as proposed, is not likely to jeopardize the continued existence of the California tiger salamander. We have concluded that the effects of the project on reproduction, number and distribution of the species would be minimal and not appreciable rangewide. The proposed project will not impede recovery of the species but will assist recovery through the preservation and management of suitable habitat for the species and the creation of new breeding habitat.

### INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened wildlife species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the Agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Corps or made binding conditions of any grant or permit issued to the Applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to monitor and regulate the activity covered by these Incidental Take Statements and the Corps and the Applicant have a continuing duty to comply with the Reasonable and Prudent Measures and implementing Terms and Conditions set forth below. The Corps has stated that it lacks authority to regulate any of the Applicant's activities beyond the construction, operations, and maintenance phases of the proposed project. Therefore the take exempted under section 7(o) of the Act through these Incidental Take Statements is limited to take resulting from construction, operations, and maintenance of the proposed solar facility. No take is exempted for the decommissioning or repowering of the project. The protective coverage of section 7(o)(2) may lapse if: (1) the Corps fails to require the Applicant to adhere to the Terms and Conditions of the Incidental Take Statement through enforceable terms that are added their permit, (2) the Corps fails to retain

oversight to ensure compliance with the Terms and Conditions of the Incidental Take Statement, or (3) the Corps or the Applicant fails to adhere to the Terms and Conditions of the Incidental Take Statement. To monitor the impact of incidental take, the Corps or Applicant must report the progress of the action and its impact on the species to the Service as specified in the Incidental Take Statement [50 CFR 402.14(i)(3)].

In June 2015, the Service finalized new regulations implementing the incidental take provisions of section 7(a)(2) of the Act. The new regulations allow for Incidental Take Statements to rely on the use of “surrogates” for estimating the amount of take that is reasonably certain to occur as a result of the proposed action in certain circumstances. To use a surrogate to estimate take, the following criteria must be met: (1) the Incidental Take Statement must describe the causal link between the surrogate and the take of the listed species; (2) the Incidental Take Statement must explain why it is not practical to express the amount or extent of anticipated take or to monitor take-related impacts in terms of individuals of the listed species; and (3) the Incidental Take Statement must set a clear standard for determining when the level of anticipated take of the listed species has been exceeded.

The new regulations also clarify the standard regarding when the Service formulates an Incidental Take Statement [50 CFR 402.14(g)(7)], from “...if such take may occur” to “...if such take is reasonably certain to occur.” This is not a new standard, but merely a clarification and codification of the applicable standard that the Service has been using and is consistent with case law. The standard does not require a guarantee that take will result; only that the Service establishes a rational basis for a finding of take. The Service continues to rely on the best available scientific and commercial data, as well as professional judgment, in reaching these determinations and resolving uncertainties or information gaps.

We believe construction of the proposed project is relatively discrete from operations and maintenance of the facility. Therefore, we have treated these as two distinct phases when developing our Incidental Take Statement. We provide an estimate of our anticipated level of incidental take for 1) construction and 2) operations and maintenance.

## **Incidental Take Statement for Construction**

### Giant kangaroo rat

We anticipate that some giant kangaroo rats could be taken in the form of harm caused by habitat loss. Incidental take of giant kangaroo rats can be difficult to detect for the following reasons: the species' relatively small body size, the fact that they spend much of their time in underground burrows, they are nocturnal, and they can be quickly consumed by scavengers. These factors make an accurate population size estimate difficult and it is likely that most individual mortality would go undetected. In addition, mortality as a result of a loss or reduction in habitat suitability due to modification from the project may be masked by typical ecological fluctuations in population size. For this reason, the Service is quantifying incidental take as the number of acres of suitable habitat that would be temporarily or permanently impacted by the proposed project and the individuals that likely occupy that habitat. On that basis, the following level of take is anticipated: approximately 1,794 acres of suitable giant kangaroo rat habitat, currently or

recently occupied or that could become occupied within the life of the project, would be permanently impacted by the construction of the action. An additional 712 acres of suitable giant kangaroo rat habitat would be temporarily disturbed by construction activities and would be revegetated following construction. The Service estimates that all giant kangaroo rats inhabiting this approximately 2,506 acres would be subject to take in the form of harm as a result of this action. If the area of disturbance exceeds 2,506 acres, the Corps must reinstate consultation. Project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

While the benefits of relocation (i.e., minimizing mortality) outweigh the risk of capture, we provide a limit for take by capture, which when reached, would trigger reinstatement of consultation because high rates of capture may indicate that some important information about the species in the action area was not apparent (e.g., it is much more abundant than thought) during the original consultation. Conversely, because capture and relocation can be highly variable, depending upon the species and the timing of the activity, we do not anticipate a number so low that reinstatement would be triggered before the effects of the activity are greater than analyzed in the Effects Analysis. We estimate that up to 521 individual giant kangaroo rats may be captured and relocated within the action area. We expect a small number of individuals to be killed as a result of their capture and relocation. Mortality from other sources, such as the indirect effects of translocation (e.g., unable to find food in a new location) or displacement from the action area, would be difficult to observe. A similar capture and relocation plan for the California Valley Solar Ranch experienced a mortality rate from capturing giant kangaroo rats of approximately 2 percent (J. Sloan, pers. comm.). So we estimate a similar mortality rate at 2 percent of total captures or 11 individuals. Therefore, we anticipate that up to 521 individual giant kangaroo rats would be taken by capture, and that up to 11 of those captured may die as a result of their handling. If more than 521 giant kangaroo rats are captured, or more than 11 die as a result of their handling, the Corps must reinstate consultation. Project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

Incidental take of giant kangaroo rats due to vehicle strikes during project construction would be difficult to detect and quantify because of their small body size, use of underground burrows or dense cover when injured, or they may be quickly scavenged; therefore, finding a dead or injured specimen may be unlikely. The exact number of individuals killed or injured by vehicles is likely to be greater than observed; however, because we cannot predict with reasonable certainty how many giant kangaroo rats may be killed or injured by vehicles, we are unable to anticipate how much take would occur as a result of that activity. We are using the Reasonable and Prudent Measures/Terms and Conditions of this Incidental Take Statement to establish a level at which take due to vehicle strikes would warrant reinstatement of consultation (see Reasonable and Prudent Measure #3).

Incidental take of giant kangaroo rats for decommissioning or repowering activities is not exempted in this consultation. The Corps has determined that it lacks the authority and

jurisdiction over decommissioning or repowering of the project, including take likely to result from decommissioning or repowering activities.

### San Joaquin kit fox

We anticipate that some San Joaquin kit foxes could be taken as a result of the proposed action due to harm resulting from habitat loss. Approximately 1,794 acres of occupied San Joaquin kit fox habitat would be permanently impacted by the construction of the Proposed Action. The Proposed Action would result in the loss of foraging, breeding, sheltering, and dispersal habitat. An additional 712 acres of occupied San Joaquin kit fox habitat would be temporarily impacted by construction activities, but would be restored to pre-project conditions following construction. Based on the results of surveys in the action area, we estimate up to 22 individual San Joaquin kit foxes inhabit the action area. We estimate that up to 16 San Joaquin kit foxes currently inhabit the solar generation facility area and all would be subject to take in the form of harm as a result of construction of the proposed solar arrays and associated infrastructure. We expect few San Joaquin kit foxes would be killed resulting from project activities; the most likely cause of lethal take would be by vehicle strike. Typical mortality rates from vehicle strike are approximately 10 percent (Bjurlin et al. 2005, PVS 2014). Based on these data we can expect that up to 3 of the 22 San Joaquin kit foxes in the project area may be subject to take caused by vehicle strike. We expect that few, if any, additional foxes would be killed by other project activities.

Finding a dead or injured San Joaquin kit foxes may be unlikely across the total area of the project site. Due to their small size San Joaquin kit foxes may be quickly scavenged. Based on their denning behavior, they may seek cover or shelter if injured. Detecting dead foxes may be difficult due to their cryptic coloration and small size. Consequently the actual number of San Joaquin kit foxes killed or injured by the proposed project would be difficult to ascertain. However, foxes killed by vehicle strike may be more easily detected due to the limited vegetation around roadways. Similar to other forms of take, detection of injury or mortality caused by vehicle strike would be challenging, because mortality may not be immediate and injured individuals may move to locations where they would not be detected; furthermore, dead foxes are likely to be scavenged quickly. The actual number of individuals killed by vehicles is likely to be greater than what is observed.

We must provide a level at which formal consultation would have to be reinitiated. For the San Joaquin kit fox, when we determine an appropriate take level that would trigger reinitiation, we are considering what could be detected, anticipating that the actual take would be higher than what could be detected and we set the number that triggers reinitiation below that level. We are reasonably certain that if three San Joaquin kit foxes or one pregnant or lactating female San Joaquin kit fox are found dead or injured, more have been taken than were not detected and that impacts of the take we anticipate overall (22 individuals) may have been exceeded. Loss of more than three individuals or one pregnant or lactating female would become a substantial enough impact that it would warrant further analysis. Consequently, at the point three (3) San Joaquin kit foxes or one (1) pregnant or lactating female San Joaquin kit fox have been found dead or injured as a result of project activities, the Corps must contact our office immediately to reinitiate formal consultation. Project activities that are likely to cause additional take should

cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

Incidental take of San Joaquin kit foxes for decommissioning or repowering activities is not exempted in this consultation. The Corps has determined that it lacks the authority and jurisdiction decommissioning or repowering of the project, including take likely to result from decommissioning or repowering activities.

#### Blunt-nosed leopard lizard

We anticipate that some blunt-nosed leopard lizards could be taken as a result of the proposed action. Incidental take of blunt-nosed leopard lizards can be difficult to detect for the following reasons: the species' relatively small body size, the fact that they spend time in underground burrows, they are cryptically colored, and they can be quickly consumed by scavengers. These factors make an accurate population size estimate difficult and it is likely that most individual mortality would go undetected. In addition, mortality as a result of a loss or reduction in habitat suitability due to modification from the project may be masked by typical ecological fluctuations in population size. We expect the incidental take to be in the form of harm due to habitat loss. Approximately 1,794 acres of suitable blunt-nosed leopard lizard habitat would be permanently impacted by the construction of the Proposed Action. The Proposed Action would result in the loss of foraging, breeding, sheltering, and dispersal habitat. An additional 712 acres of suitable blunt-nosed leopard lizard habitat would be temporarily impacted by construction activities but would be restored to pre-project conditions following construction.

We cannot quantify the precise number of blunt-nosed leopard lizards that may be taken as a result of the proposed actions. First, we do not have adequate density estimates for the project area, nor are any suitable equivalents available in the literature. Also, blunt-nosed leopard lizards move across the landscape over time; for example, animals may have entered or departed the project footprint area since the time of pre-construction surveys and before completion of any exclusion fencing. Other individuals may not be detected due to their cryptic coloration, small size, and fossorial nature. The protective measures proposed by the Corps and the Applicant are likely to prevent mortality or injury of most individuals; however, some individuals are likely to remain in the project area and subject to the effects described above. In addition, finding a dead or injured blunt-nosed leopard lizard is unlikely due to their small size and scavengers.

Consequently, while we are reasonably certain that some take will occur, we are unable to anticipate the actual number of blunt-nosed leopard lizards that would be taken by the proposed project; however, we provide a level at which formal consultation would have to be reinitiated. Therefore, we anticipate that all blunt-nosed leopard lizards within the 2,506 acres of permanent and temporary disturbance would be taken by the proposed action. If the area of disturbance exceeds 2,506 acres, the Corps must reinitiate consultation. Project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

Incidental take of blunt-nosed leopard lizards due to vehicle strikes during construction would be difficult to detect and quantify because of their small body size, use of underground burrows or dense cover when injured, they may be quickly scavenged, and the number on roads may fluctuate along with natural population changes; therefore, finding a dead or injured specimen may be unlikely. The exact number of individuals killed or injured by vehicles is likely to be greater than observed. Because we cannot predict with reasonable certainty how many blunt-nosed leopard lizards may be killed or injured by vehicles, we are unable to anticipate how much take would occur as a result of that activity. We are using the Reasonable and Prudent Measures/Terms and Conditions of this Incidental Take Statement to establish a level at which take due to vehicle strikes would warrant reinitiation of consultation (see Reasonable and Prudent Measure #3).

Incidental take of blunt-nosed leopard lizards for decommissioning or repowering activities is not exempted in this consultation. The Corps has determined that it lacks the authority and jurisdiction over decommissioning or repowering of the project, including take likely to result from decommissioning or repowering activities.

#### California tiger salamander

The Service anticipates all California tiger salamanders in construction areas would be subject to take as a result of project activities. Take would occur in the form of capture during relocation activities and in the form of injury or death as a result of construction activities if they are accidentally injured or killed during capture and relocation or are unable to be collected for relocation and remain in active construction areas. The probability of these risks may be increased if substantial rainfall (greater than 0.5 inch of rain in a 24-hour period) occurs, and California tiger salamanders are dispersing through the area during work activities.

Incidental take of California tiger salamanders would be difficult to detect because of their small body size and use of underground burrows; finding a dead or injured specimen may be unlikely. California tiger salamanders injured or killed during translocation efforts are likely to be observed; however, mortality from other sources, including the indirect effects of translocation (e.g., unable to find food in a new location) or displacement from the action area, would be difficult to observe. Consequently, the observed number of California tiger salamanders taken may be lower than the actual number taken.

All individual California tiger salamanders remaining in dispersal area between the 1.2 mile and 1.3 mile distance from breeding ponds would be subject to harm. These individuals would not be included in the proposed capture and relocation activities and could be killed or injured as a result of construction activities.

While we expect California tiger salamanders to be observed in the action area during the project construction period, we anticipate that few, if any, would be found dead or injured. We expect the majority of observable take to be during capture and relocation activities. In our best judgment, based upon the information available, if five (5) adult California tiger salamanders are found dead or injured during capture and relocation activities, the Corps must reinitiate consultation. We expect few instances of take would be observed during other project activities.

In our best judgment, based upon the information available, if three (3) adult California tiger salamanders are found dead or injured during the 18 months of construction activities, the Corps must reinitiate consultation. We believe that if three (3) individuals are found killed or injured, then a larger number have been taken but not observed; this would represent a greater impact to the local population than we currently anticipate. Project activities that are likely to cause additional take should cease during reinitiation because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

In addition to the incidental take we anticipate from construction of the project, we also conclude that incidental take of California tiger salamanders due to vehicle strikes during construction would occur. Similar to other forms of take, such injury or mortality would be difficult to detect and quantify because mortality may not be immediate and injured individuals may move to locations where they would not be detected, and dead salamanders are likely to be scavenged quickly or desiccate and be unrecognizable; therefore, finding a dead or injured specimen may be unlikely. The exact number of individuals killed by vehicles is likely to be greater than what is observed. Unlike the take due to harm described above, we cannot predict with reasonable certainty how many California tiger salamanders may be killed or injured by vehicles, so we are unable to anticipate how much take would occur as a result of that activity. Therefore, we are using the Reasonable and Prudent Measures/Terms and Conditions of this Incidental Take Statement to establish a level at which take due to vehicle strikes would warrant reinitiation of consultation (see Reasonable and Prudent Measure #3).

Incidental take of California tiger salamanders decommissioning or repowering activities is not exempted in this consultation. The Corps has determined that it lacks the authority and jurisdiction over decommissioning or repowering of the project, including take likely to result from decommissioning or repowering activities.

### **Incidental Take Statement for Operations and Maintenance**

#### Giant kangaroo rat

We anticipate that effects to giant kangaroo rats during the operational period, including maintenance activities, to be similar to those discussed for construction but will occur at a reduced level. We are unable to predict at what extent giant kangaroo rats may use the solar generation facility after the construction phase. However, we do not anticipate that giant kangaroo rats will reinhabit the solar generation facility site to pre-project levels. Incidental take of giant kangaroo rats due to maintenance activities or vehicle strikes during operations and maintenance would be difficult to detect and quantify because of their small body size, use of underground burrows or dense cover when injured, and they may be quickly scavenged; therefore, finding a dead or injured specimen may be unlikely. The exact number of individuals killed or injured by vehicles is likely to be greater than observed; however, because we cannot predict with reasonable certainty how many giant kangaroo rats may be killed or injured by vehicles, we are unable to anticipate how much take would occur as a result of that activity.

We must provide a level at which formal consultation would have to be reinitiated. For the giant kangaroo rat, when we determine an appropriate take level that would trigger reinitiation, we are

considering what could be detected, anticipating that the actual take would be higher than what could be detected and we set the number that triggers reinitiation below that level. We expect that few if any individuals will be killed or injured as a result of operations and maintenance activities annually and cumulatively over the 30-year operational phase of the project. Therefore, if two (2) giant kangaroo rats are found dead or injured within a 12-month period, we expect more have been taken that were not detected and that impacts of the take we anticipate overall may have been exceeded. Detection of more than two dead or injured individuals in a 12-month period would indicate that impacts to giant kangaroo rats are greater than we anticipated and warrants further analysis. Consequently, at the point two (2) giant kangaroo rats have been found dead or injured within a 12-month period or thirty (30) giant kangaroo rats total over the 30-year operations phase of the project as a result of operations and maintenance activities, the Corps must contact our office immediately to reinitiate formal consultation.

We are unable to determine the extent that giant kangaroo rats will reinhabit the areas under and around the panel arrays. However, we do not anticipate giant kangaroo rats to reinhabit the areas at preconstruction densities and ground disturbing activities are expected to be minimal. Because some ground disturbing activities are anticipated during maintenance activities, if 2 (two) precincts over a 12-month period or thirty (30) precincts over the 30-year operational period are disturbed or destroyed, the Corps must contact our office immediately to reinitiate formal consultation. We believe that if these numbers are exceeded that the species has reinhabited the area more than anticipated or that impacts from operation and maintenance activities are beyond our analysis.

If reinitiation is required due to the anticipated level of take being exceeded as described above, project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

#### San Joaquin kit fox

We are unable to predict at what extent San Joaquin kit fox may use the solar generation facility after the construction phase. However, we do not anticipate that San Joaquin kit fox will reinhabit the solar generation facility site to pre-project levels. We anticipate that some San Joaquin kit foxes that may disperse through or inhabit habitat within or near the panel arrays could be taken as a result of the proposed operations and maintenance activities due to harm including noise, human presence, or lighting that significantly impairs normal behavioral patterns. We expect a subset of those San Joaquin kit foxes would be taken in the form of harm in the form of injury or mortality resulting from project activities. The most likely cause of lethal take would be by vehicle strike.

We are unable to determine the exact extent of the take of San Joaquin kit fox during operation and maintenance because it is unknown if and to what extent San Joaquin kit fox may reinhabit the panel arrays. We expect that few if any individuals will be killed or injured as a result of operations and maintenance activities over the 30 year operational phase of the project. Also, finding a dead or injured San Joaquin kit foxes may be unlikely across the total area of the project site. Due to their small size San Joaquin kit foxes may be quickly scavenged. Based on

their denning behavior, they may seek cover or shelter if injured. Detecting dead foxes may be difficult due to their cryptic coloration and small size. Consequently the actual number of San Joaquin kit foxes killed or injured by the proposed project would be difficult to ascertain. However, foxes killed by vehicle strike may be more easily detected due to the limited vegetation around roadways. Similar to other forms of take, detection of injury or mortality caused by vehicle strike would be challenging, because mortality may not be immediate and injured individuals may move to locations where they would not be detected; furthermore, dead foxes are likely to be scavenged quickly. The actual number of individuals killed by vehicles is likely to be greater than what is observed.

We must provide a level at which formal consultation would have to be reinitiated. For the San Joaquin kit fox, when we determine an appropriate take level that would trigger reinitiation, we are considering what could be detected, anticipating that the actual take would be higher than what could be detected and we set the number that triggers reinitiation below that level. We believe that with implementation of the proposed protective measures, few San Joaquin kit foxes will be killed or injured during operation and maintenance of the facility. We are reasonably certain that if San Joaquin kit foxes are found dead or injured, more have been taken than were not detected and that impacts of the take we anticipate overall may have been exceeded. We believe that injury or death of more two (2) individuals within a 12-month period or six (6) cumulatively over the 30-year operational phase would become a substantial enough impact that it would exceed the anticipated effects of the project and would therefore warrant further analysis. Consequently, at the point two (2) San Joaquin kit foxes within a 12-month period or six (6) cumulatively over the 30-year operational phase have been found dead or injured as a result of operations and maintenance activities, the Corps must contact our office immediately to reinitiate formal consultation. Project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

#### Blunt-nosed leopard lizard

We anticipate that effects to blunt-nosed leopard lizards during the operational period, including maintenance activities, to be similar to those discussed for construction but will occur at a reduced level. We are unable to predict at what extent blunt-nosed leopard lizards may use the solar generation facility after the construction phase. However, we anticipate that some blunt-nosed leopard lizards could be taken as a result of the proposed operations and maintenance activities, including vehicle strikes. Incidental take of blunt-nosed leopard lizards can be difficult to detect for the following reasons: the species' relatively small body size, the fact that they spend time in underground burrows, they are cryptically colored, and they can be quickly consumed by scavengers. These factors make an accurate population size estimate difficult and it is likely that most individual mortality would go undetected.

Consequently, while we are reasonably certain that some take will occur, we are unable to anticipate the actual number of blunt-nosed leopard lizards that would be taken by the proposed project; however, we provide a level at which formal consultation would have to be reinitiated. We expect that few individuals will be killed or injured as a result of operations and maintenance activities over the 30-year operational phase of the project. We do not expect blunt-nosed

leopard lizards to occur in high densities in the solar generation facilities after construction. Therefore, if two (2) blunt-nosed leopard lizards within a 12-month period or ten (10) total blunt-nosed leopard lizards cumulatively over the 30-year operational period are found dead or injured, we expect more would likely have been taken that were not detected. Loss of more than two (2) individuals in a 12-month period or ten (10) total blunt-nosed leopard lizards cumulatively over the 30-year operational period would represent a substantial enough impact that it would warrant further analysis. Consequently, at the point two (2) blunt-nosed leopard lizards within a 12-month period or ten (10) over the 30-year operational period have been found dead or injured as a result of operations and maintenance activities, the Corps must contact our office immediately to reinitiate formal consultation. Project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

#### California tiger salamander

We anticipate that effects to California tiger salamanders during the operational period, including maintenance activities, to be similar to those discussed for construction but will occur at a reduced level. We are unable to predict at what extent California tiger salamanders may use the solar generation facility after the construction phase. However, we anticipate that some California tiger salamanders could be taken as a result of the proposed operations and maintenance activities. Incidental take of California tiger salamanders would be difficult to detect because of their small body size and use of underground burrows; finding a dead or injured specimen may be unlikely. Consequently, the observed number of California tiger salamanders taken may be lower than the actual number taken.

Incidental take of California tiger salamanders due to vehicle strikes during operations and maintenance is reasonably certain to occur. The risk to individuals of operations and maintenance activities would increase during periods of rainfall, especially at night. Injury or mortality would be difficult to detect and quantify because mortality may not be immediate and injured individuals may move to locations where they would not be detected, and dead salamanders are likely to be scavenged quickly or desiccate and be unrecognizable; therefore, finding a dead or injured specimen may be unlikely. We expect that few if any individuals will be killed or injured as a result of operations and maintenance activities over the 30 year operational phase of the project. The exact number of individuals killed by operations and maintenance activities is likely to be greater than what is observed. We cannot predict with reasonable certainty how many California tiger salamanders may be killed or injured, so we are unable to anticipate how much take would occur as a result of that activity; however, we provide a level at which formal consultation must be reinitiated. If two (2) California tiger salamanders within a 12-month period or ten (10) total California tiger salamanders cumulatively over the 30-year operational period are found dead or injured, we expect that more have been taken that were not detected and our anticipated impacts of the take may have been exceeded and would warrant further analysis. Consequently, at the point two (2) California tiger salamanders within a 12-month period or ten (10) total California tiger salamanders cumulatively over the 30-year operational period have been found dead or injured as a result of operations and maintenance activities, the Corps must contact our office immediately to reinitiate formal consultation. Project activities that are likely to cause additional take should cease during this review period

because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

## REASONABLE AND PRUDENT MEASURES

The following Reasonable and Prudent Measures are necessary and appropriate to minimize the impacts of the incidental take of the giant kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander:

1. To minimize the effects of habitat loss and direct injury/mortality of the giant kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander, the Corps must ensure the Applicant adheres to all conservation measures in the biological assessment, and the additional measures as noted in this biological opinion and under the additional Term and Condition 1 noted below.
2. The Corps and the Applicant must ensure that take due to not detecting animals that are present or mishandling of animals to be captured and relocated out of harm's way will be minimized by employing biologists approved by the Service before they conduct activities associated with this biological opinion. In particular, the biologists must be qualified to survey for, conduct burrow excavations, or capture and move giant kangaroo rats and California tiger salamanders in the action area.
3. The Corps and the Applicant must ensure that effects to the giant kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander are minimized during construction of the project by implementation of additional protective measures identified below, and ensuring that take due to vehicle strikes during construction activities is commensurate with our analysis.
4. The Corps and the Applicant must ensure that effects to the giant kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard, and California tiger salamander are minimized during operations and maintenance of the facility by implementation of additional protective measures identified below and ensuring that take during operations and maintenance activities is commensurate with our analysis.

## TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Corps must comply with or ensure through monitoring and enforcement actions that its Applicant complies with the following Terms and Conditions, which implement the Reasonable and Prudent Measures described above and outline reporting and monitoring requirements. These Terms and Conditions are non-discretionary.

1. The following Terms and Conditions implement Reasonable and Prudent Measure 1:
  - a. The Corps must include all measures, plans, conditions, and reporting requirements in the biological assessment and this biological opinion as binding terms and conditions of any and all permits it issues for the Project and must monitor and enforce their implementation. The Applicant must fully implement and adhere to all proposed conservation measures, plans, and easements, and all other conditions and reporting requirements in the biological assessment and this biological opinion, as conditioned in any permit issued by the Corps.
  - b. The Corps and the Applicant must minimize the potential for the taking of federally-listed species resulting from Project related activities by implementation of the conservation measures as described in the biological assessment and appendices. The Corps or the Applicant must submit final conservation and minimization plans, including the Conservation Lands Management Plan, Invasive Plant Management Plan, Habitat Restoration and Revegetation Plan, and Spill Prevention Plan, for approval by the Service at least 30 days prior to the start of construction activities.
  - c. The Corps or the Applicant must be the point of contact in the field for the Project and must maintain a copy of this biological opinion on-site whenever construction is taking place. The names and telephone numbers of appropriate contacts must be provided to the Service at least 30 days prior to groundbreaking. Prior to ground disturbance, the on-site project supervisor must submit a letter to the Service verifying that he/she possesses a copy of this biological opinion and that they have read and understand the Terms and Conditions.
2. The following Terms and Conditions implement Reasonable and Prudent Measure 2:
  - a. The Corps or the Applicant must request our written approval of any biologists either entity wishes to employ to conduct any avoidance, minimization, and conservation measures including surveying; monitoring; conducting training sessions; and capturing, handling, and relocating giant kangaroo rats or California tiger salamanders. The request must be in writing and be received by the Service's Ventura Fish and Wildlife Office at least 30 days prior to the commencement of any of these activities.
  - b. The Corps or the Applicant must include all information for authorization necessary for the Service to make a determination on the qualifications of an individual. At a minimum the request must include: (1) relevant education; (2) relevant training on species identification, survey techniques, handling individuals of different age classes, and handling of different life stages by a permitted biologist or recognized species expert authorized for such activities by the Service; (3) a summary of field experience conducting requested activities (to include project/research information); (4) a summary of biological opinions under which they were authorized to work with the listed species and at what level (such

as construction monitoring versus handling), this should also include the names and qualifications of persons under which the work was supervised as well as the amount of work experience on the actual project; (5) a list of Federal Recovery Permits [10(a)1(A)] held or under which are authorized to work with the species (to include permit number, authorized activities, and name of permit holder); and (6) any relevant professional references with contact information.

3. The following Terms and Conditions implement Reasonable and Prudent Measure 3:
  - a. The Corps or the Applicant must provide to the Service documentation that all workers present on the project site have completed the appropriate worker education programs as stated in the Description of the Proposed Action section. The Corps must ensure that the Applicant complies with this condition.
  - b. The Corps or the Applicant must ensure that relocation sites and the rationale for the location for giant kangaroo rats are identified and approved by Service at least 30 days prior to project initiation. To determine activity, potential relocation sites that will utilize existing inactive precincts must be monitored by remote cameras and with bait for 10 days immediately prior to the potential release of an individual to be relocated. If after 10 days of no activity or new sign of activity, the precinct may be determined inactive.
  - c. The Applicant must ensure no nursing female or dependent juvenile giant kangaroo rats are disturbed during burrow excavation. Any burrows containing a lactating female must not be excavated and a 250-foot buffer from all construction activities must be maintained until lactation has ceased and presumably any offspring are independent. The precinct may be monitored by a remote camera to observe activity. Because the occupied precinct would be enclosed with fencing and would potentially inhibit or preclude foraging, a sufficient amount of seed to sustain a nursing female must be placed at the precinct opening. If the designated biologist can determine with certainty which precinct the lactating female is occupying, adjacent precincts may be excavated only if impacts to the occupied precinct is avoided.
  - d. To reduce the amount of time a lactating/nursing female may be in a trap, all traps set from January 1 through August 31 for the capture and relocation of giant kangaroo rats must be set no more than 1 hour prior to sunset and closed no more than 1 hour after sunrise. All traps set during this period when females may be lactating/nursing must also be checked for occupancy every 2 hours between sunset and sunrise.
  - e. Consistent with established parameters set in protocols for other San Joaquin Valley kangaroo rats, during the threat of inclement weather, such as the National Weather Service prediction of a 40 percent or greater chance of rain, all traps for giant kangaroo rats will be closed. Should the air temperature exceed 105 degrees Fahrenheit all traps will be closed. If the air temperature is predicted to drop

below 50 degrees Fahrenheit, synthetic batting or other appropriate insulating material must be placed in the open trap.

- f. Destruction of San Joaquin kit fox dens must be avoided unless they are in an area of direct and permanent destruction, or pose a risk of direct harm to the species. If dens are in an area of temporary disturbance or not directly impacted by project activities, a one-way door must be installed to prevent San Joaquin kit foxes from utilizing the den during construction activities.
  - g. Any San Joaquin kit fox natal den identified in the project area must be avoided by a buffer determined after discussions with the Service. This agreed upon buffer will remain until the juveniles are independent and the den is no longer used by any individuals. If project activities are to occur in proximity to the buffer, a Service approved biologist must monitor project activities in the area and be given the authority to cease any activity at that causes disturbance to the individuals using the den.
  - h. All working ranch dogs must be within eyesight and under strict voice commands of the handler at all times.
  - i. Little Panoche Road and all County-maintained roads within 1 mile of the proposed project boundaries used for project related traffic, including personal vehicles, must be surveyed every morning within 1 hour of sunrise for animals that have been struck by vehicles. Any wildlife observed on the road, alive or dead, must be recorded along with the location, date, time, photos, and any other information important to this consultation.
  - j. If five (5) giant kangaroo rats, three (3) San Joaquin kit foxes, one (1) pregnant or lactating female San Joaquin kit fox, two (2) blunt-nosed leopard lizards, or five (5) California tiger salamanders are found injured or dead, and if such injury or mortality is attributable to a strike by a project-related vehicle during construction, the Corps must contact our office immediately to reinstate consultation. Project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.
4. The following Term and Condition implements Reasonable and Prudent Measure 4:
- The Corps must monitor or ensure that their Applicant monitors the project site at a minimum of every 2 weeks during the operational period for compliance with this biological opinion and survey for take of giant kangaroo rats, San Joaquin kit fox, blunt-nosed leopard lizards, and California tiger salamanders. Monitoring must include surveying all roadways, adjacent land, and any areas of recent ground disturbance for dead individuals.

## REPORTING REQUIREMENTS

Pursuant to 50 CFR 402.14(i)(3), the Corps must report the progress of the action and its impact on the species to the Service as specified in this Incidental Take Statement. In addition to the reporting described in the Description of the Proposed Action section of this document, the Corps must ensure submittal of additional reporting, as follows:

During construction, the Corps must submit a summary report to the Service for review by the 7<sup>th</sup> day of every month during project construction activities. The report must cover the previous month's work and include: the project progress; amount of habitat disturbed; conservation measures implemented; sensitive species observed, captured, or relocated; a table tracking the monthly and cumulative amount of take; and any other information important to the analysis of this biological opinion. This report should also contain a concise comprehensive section summarizing all report information from the date of project initiation.

During operations and maintenance, the Corps must submit a summary report to the Service for review by the 7th day of every January and July. The report must cover the all work since the previous report and include: activities performed, amount of habitat disturbed, conservation measures implemented, sensitive species observed, a table tracking the cumulative amount of take, and any other information important to the analysis of this biological opinion. This report should also contain a concise comprehensive section summarizing all report information from the date of the initiation of operations and maintenance cumulative through the current reporting period.

The Corps must report injury or mortality to any giant kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard, or California tiger salamander to the Service within 2 days of observation.

The Service recognizes that the Applicant may author the reports described above. However, the Applicant should submit their reports to the Corps, who must then review these reports to determine compliance with their permitting conditions prior to submitting them to the Service. The Corps has a continuing duty to monitor and regulate the activity covered by the Incidental Take Statements through the enforceable binding conditions included in any grants or permits they issue to the Applicant.

## DISPOSITION OF DEAD OR INJURED SPECIMENS

As part of this Incidental Take Statement and pursuant to 50 CFR 402.14(i)(1)(v), upon locating a dead or injured California tiger salamander, initial notification within 2 working days of its finding must be made by telephone and in writing to the Ventura Fish and Wildlife Office (805-644-1766). The report must include the date, time, location of the carcass, a photograph, cause of death or injury, if known, and any other pertinent information.

The Corps or the Applicant must ensure the safe handling of any injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in

the best possible state. The Corps or the Applicant must ensure the safe transportation injured animals to a qualified veterinarian. Should any treated California tiger salamander survive, the Corps or the Applicant must contact the Service regarding the final disposition of the animal(s). We recommend that dead California tiger salamanders identified in the action area be tested for amphibian disease and/or undergo genetic analysis for the purpose of investigating hybridization; however, this recommendation is discretionary and to be determined by the Corps upon contacting the Ventura Fish and Wildlife Office at the discovery of a dead California tiger salamander. If the Corps chooses not to submit dead California tiger salamanders for testing, they must be placed with the California Academy of Sciences; Contact: Jens Vindum, Collections Manager, California Academy of Sciences Herpetology Department, Golden Gate Park, San Francisco, California, 94118, (415) 750-7037.

### CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. The Corps should coordinate with the Service to implement recovery actions described in the Recovery Plan for Upland Species for the San Joaquin Valley, California.
2. We recommend that the Service-approved biologists relocate any native animal species within work areas to suitable habitat outside of the project area if such activities are in compliance with State laws.

The Service requests notification of the implementation of any conservation recommendations so we may be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats.

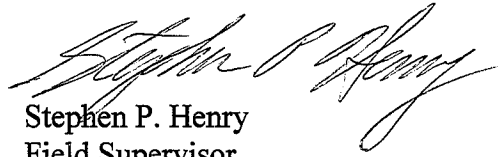
### REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the request for formal consultation. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the Corps' action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the Corps' action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) will have lapsed and any further take would be a violation of

section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending reinitiation.

If you have any questions about this biological opinion, please contact Christopher Diel of my staff at 805-644-1766, extension 305, or by e-mail at [christopher\\_diel@fws.gov](mailto:christopher_diel@fws.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Stephen P. Henry", is written over the typed name and title.

Stephen P. Henry  
Field Supervisor

## LITERATURE CITED

- Ahl, J.S.B. 1991. Factors affecting contributions of the tadpole shrimp, *Lepidurus packardi*, to its overwintering egg reserves. *Hydrobiologia* 212:137-143.
- Althouse and Meade. 2015. Topaz Solar Farm end of project report condition of approval 66: San Joaquin kit fox. Paso Robles, California.
- Anderson, J. 1968. A comparison of the food habits of *Ambystoma macrodactylum sigillatum*, *Ambystoma macrodactylum croceum*, and *Ambystoma tigrinum californiense*. *Herpetologica* 24:273-284.
- Barry, S.J., and H.B. Shaffer. 1994. The status of the California tiger salamander (*Ambystoma californiense*) at Lagunita: a 50-year update. *Journal of Herpetology* 28:159-164.
- Bjurlin, C.D., B.L. Cypher, C.M. Wingert, and C.L. Van Horn Job. 2005. Urban roads and the endangered San Joaquin kit fox. California State University Stanislaus; Endangered Species Recovery Program, Fresno, California.
- Bornstein, R.D. 1968. Observations of the urban heat island effect in New York City. *Journal of Applied Meteorology* 7:575-582.
- Bowles A.E., and J.K. Francine. 1993. Effects of simulated aircraft noise on hearing, food detection, and predator avoidance behavior of the kit fox, *Vulpes macrotis*. *Journal of the Acoustical Society of America* 93:2378.
- Briden, L.E., M. Archon, and D.L. Chesemore. 1987. Ecology of the San Joaquin kit fox in western Merced County. California State University, Fresno.
- Caughley, G. and A. Gunn. 1996. *Conservation Biology in Theory and Practice*. Blackwell Science, Cambridge, Massachusetts.
- [CNDDB] California Department of Fish and Wildlife, Natural Diversity Database. 2015. Element Occurrence Reports, Sacramento, California.
- [CDFW] California Department of Fish and Wildlife. 2004. Approved Survey Methodology for the Blunt-Nosed Leopard Lizard. California Department of Fish and Game, Sacramento, California.
- Cypher, B.L. 2003. Foxes (*Vulpes* species, *Urocyon* species, and *Alopex lagopus*). In: *Wild Mammals of North America: Biology, Management, and Conservation* (G.A. Feldhamer, B.C. Thompson, and J.A. Chapman, editors). Johns Hopkins University Press, Baltimore, Maryland.

- Cypher, B.L., and J.H. Scrivner. 1992. Coyote control to protect endangered San Joaquin kit foxes at the Naval Petroleum Reserves, California. *In: Proceedings of the 15th Vertebrate Pest Conference* (J.E. Borrecco and R.E. Marsh, editors). University California, Davis.
- Cypher, B.L., and K.A. Spencer. 1998. Competitive interactions between coyotes and San Joaquin kit foxes. *Journal of Mammalogy* 79:204-214.
- Cypher, B.L., G.D. Warrick, M.R. Otten, T.P. O'Farrell, W.H. Berry, C.E. Harris, and T.T. Kato. 2000. Population dynamics of San Joaquin kit foxes at the Naval Petroleum Reserves in California. *Wildlife Monographs* 145:1-43.
- Cypher, B.L., H.O. Clark, Jr., P.A. Kelly, C. Van Horn Job, G.D. Warrick, and D.F. Williams. 2001. Interspecific interactions among wild canids: Implications for the conservation of endangered San Joaquin kit foxes. *Endangered Species Update* 18:171-174.
- Cypher, B.L., P.A. Kelly, and D.F. Williams. 2003. Factors influencing populations of endangered San Joaquin kit foxes: Implications for conservation and recovery. *In: The Swift Fox: Ecology and Conservation in a Changing World* (M.A. Sovada and L. Carbyn, editors). Canadian Plains Research Center, Regina, Saskatchewan.
- Cypher, B.L., C.D. Bjurlin, and J.L. Nelson. 2005. Effects of two-lane roads on endangered San Joaquin kit foxes. Prepared for the California Department of Transportation. Sacramento, California.
- Cypher, B.L., S.E. Phillips, and P.A. Kelly. 2007. Habitat suitability and potential corridors for San Joaquin kit fox in the San Luis Unit, Fresno, Kings, and Merced Counties, California. Prepared for the U.S. Bureau of Reclamation, South-Central California Area Office, and the U.S. Fish and Wildlife Service.
- Dyer, A.R., and K.J. Rice. 1999. Effects of competition on resource availability and growth of a California bunchgrass. *Ecology* 80:1697-2710.
- Egoscue, H.J. 1962. Ecology and life history of the kit fox in Tooele County, Utah. *Ecology* 43:481-497.
- Feaver, P.E. 1971. Breeding pool selection and larval mortality of three California amphibians: *Ambystoma tigrinum californiense*, *Hyla regilla*, and *Scaphiopus hammondi hammondi*. Master's thesis, Department of Biology, Fresno State College, Fresno California.
- Fisher, R.N., and H.B. Shaffer. 1996. The decline of amphibians in California's Great Central Valley. *Conservation Biology* 10:1387-1397.
- Frank, C.L. 1988. The effects of moldiness level on seed selection by *Dipodomys spectabilis*. *Journal of Mammalogy* 69:358-362.

- Frankham, R., and K. Ralls. 1998. Conservation biology - Inbreeding leads to extinction. *Nature* 392:441-442.
- Frost, W.E., and N .K. McDougald. 1989. Tree canopy effects on herbaceous production of annual rangeland during drought. *Journal of Range Management* 42:281-283.
- Germano, D.J., and D.F. Williams. 1992. *Gambelia sila* (blunt-nosed leopard lizard) reproduction. *Herpetological Review* 23:117-118.
- Germano, D.J., and D.F. Williams. 2005. Population ecology of blunt-nosed leopard lizards in high elevation foothill habitat. *Journal of Herpetology* 39:1-18.
- Germano, D.J., D.F. Williams, and W. Tordoff III. 1994. Effect of drought on blunt-nosed leopard lizards (*Gambelia sila*). *Northwestern Naturalist* 75:11-19.
- Germano, D.J., G.B. Rathbun, and L.R. Saslaw. 2001. Managing exotic grasses and conserving declining species. *Wildlife Society Bulletin* 29:551-559.
- Germano, D. J., D.F. Williams, and P. Kelly. 2004. Long-term fluctuation of a population of blunt-nosed leopard lizards in relation to precipitation and herbaceous plant biomass. Presented at the San Joaquin Natural Communities Conference, May 25, 2004, Bakersfield, California.
- Germano, D.J., G.B. Rathbun, E. Cypher, L R. Saslaw, and S. Fitton. 2005. Effects of livestock grazing on a community of species at risk of extinction in the San Joaquin Valley, California. 2005 Annual Report: the Lokern Grazing Study Project. Bureau of Land Management, Bakersfield, California.
- Goldingay, R.L., P.A. Kelly, and D.F. Williams. 1997. The kangaroo rats of California: endemism and conservation of keystone species. *Pacific Conservation Biology* 3:47-60.
- Good, S.V., D.F. Williams, K. Ralls, and R.C. Fleischer. 1997. Population structure of *Dipodomys ingens* (Heteromyidae): the role of spatial heterogeneity in maintaining genetic diversity. *Evolution* 51:296-1310.
- Griffin, D., and K.J. Anchukaitis. 2014. How unusual is the 2012–2014 California drought? *Geophysical Research Letters* 41:9017–9023.
- Grimes, A.J., G. Corrigan, D.J. Germano, and P.T. Smith. 2014. Mitochondrial phylogeography of the endangered blunt-nosed leopard lizard, *Gambelia sila*. *The Southwestern Naturalist* 59:38-46.
- Grinnell, J. 1932. Habitat relations of the giant kangaroo rat. *Journal of Mammalogy* 13:305-320.
- Grinnell, J., J.S. Dixon, and J.M. Linsdale. 1937. Fur-bearing mammals of California. Volume 2. University California Press, Berkeley.

- Haight, R.G., and B. Cypher, P.A. Kelly, S. Phillips, H.P. Possingham, K. Ralls, A.M. Starfield, P.J. White, and D. Williams. 2002. Optimizing habitat protection using demographic models of population viability. *Conservation Biology* 16:1386-1397.
- Hall, E.R. 1946. *Mammals of Nevada*. University of California Press, Berkeley.
- Hansen, R.W., R.R. Montanucci, and K.H. Switak. 1994. Blunt-nosed leopard lizard. Life on the edge. *Wildlife* 1:272-273.
- Hanski, I., and M. Gilpin. 1991. Metapopulation dynamics: brief history and conceptual domain. *Biological Journal of the Linnean Society* 42:3-16.
- Hawbecker, A.C. 1944. The giant kangaroo rat and sheep forage. *Journal of Wildlife Management* 8:161-165.
- Hawbecker, A.C. 1951. Small mammal relationships in an *Ephedra* community. *Journal of Mammalogy* 32:50-60.
- Holland, D.C., M.P. Hayes, and E. McMillan. 1990. Late summer movement and mass mortality in the California tiger salamander (*Ambyostoma californiense*). *Southwestern Naturalist* 35:217-220.
- H.T. Harvey and Associates. 2015. Semiannual status report July-December 2014 for the California Valley Solar Ranch Project, San Luis Obispo County, California. San Luis Obispo, California.
- Jennings, M.R. 1995. *Gambelia sila*, blunt-nosed leopard lizard. *Catalogue of American Amphibians and Reptiles* 612:1-4.
- Jennings, M.R., and M.P. Hayes. 1994. Amphibian and reptile species of special concern in California. Report prepared for the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California.
- Jensen, C.C. 1972. San Joaquin kit fox distribution. U.S. Fish and Wildlife Service, Sacramento, California, unpublished report.
- Kelly, P., D. Williams, S. Phillips, S. Messer, D. Newman, P. Morrison, and H. Clark. 2004. Endangered giant kangaroo rats and stochastic climatic events: Documenting the impact of flash flooding. 84th Annual Meeting American Society of Mammalogists. Humboldt State University, Arcata, California. June 16, 2004.
- Kelly, P.A., S.E. Phillips, and D.F. Williams. 2005. Documenting ecological change in time and space: The San Joaquin Valley of California. *In: Mammalian Diversification: From Chromosomes to Phylogeography (A Celebration of the Career of James L. Patton)*. (E.A. Lacy and P. Myers, editors), University of California Press.

- King, J.L., M.A. Simovich and R.C. Brusca. 1996. Species richness, endemism, and ecology of crustacean assemblages in northern California vernal pools. *Hydrobiologia* 328:85-116.
- Knapp, D.K. 1979. Effects of Agricultural Development in Kern County, California, on the San Joaquin Kit Fox in 1977. Final Report, Project E-1-1, Job V-1.21, Non-game Wildlife. Investigations. California Department of Fish and Game, Sacramento, California.
- Koopman, M.E., B.L. Cypher, and J.H. Scrivner. 2000. Dispersal patterns of San Joaquin kit foxes (*Vulpes macrotis mutica*). *Journal of Mammalogy* 81:213-222.
- Kristan, William B., III. 2003. The role of habitat selection behavior in population dynamics: source-sink systems and ecological traps. *Oikos* 103:457-468.
- Lande, R. 1988. Genetics and demography in biological conservation. *Science* 241:1455-1460.
- Laughrin, L. 1970. San Joaquin kit fox: its distribution and abundance. California Department of Fish and Game, Sacramento, Wildlife Management Branch, Report No. 70-2.
- Leyse, K., and S.P. Lawler. 2000. Effect of mosquitofish (*Gambusia affinis*) on California tiger salamander (*Ambystoma californiense*) larvae in permanent ponds. Mosquito Control Research, annual report 2000.
- Live Oak Associates. 2010a. Protocol-level dry season branchiopod survey results, 90-day report. Panoche Valley Solar Farm, San Benito County, California. San Jose, California.
- Live Oak Associates. 2010b. Protocol-level wet season branchiopod survey results 90-day report, Panoche Valley Solar Farm. San Jose, California.
- Live Oak Associates. 2010c. Non-protocol branchiopod survey results, Solargen Energy, Panoche Valley mitigation parcels. San Jose, California.
- Loew, S.S., D.F. Williams, K. Ralls, K. Pilgrim, and R.C. Fleischer. 2005. Population structure and genetic variation in the endangered giant kangaroo rat (*Dipodomys ingens*). *Conservation Genetics* 6:495-510.
- Loredo, I., and D. Van Vuren. 1996. Reproductive ecology of a population of the California tiger salamander. *Copeia* 1996:895-901.
- Loredo, I., D. Van Vuren, and M.L. Morrison. 1996. Habitat use and migration behavior of the California tiger salamander. *Journal of Herpetology* 30:282-285.
- McCue, P.M., T. Kato, M.L. Sauls, and T.P. O'Farrell. 1981. Inventory of San Joaquin kit fox on land proposed as Phase II, Kesterson Reservoir, Merced County, California.
- McGrew, J.C. 1979. *Vulpes macrotis*. *Mammalian Species* 123:1-6.

- McGuire, J.A. 1996. Phylogenetic systematics of crotaphytid lizards (Reptilia, Iguania, Crotaphytidae). *Bulletin of the Carnegie Museum of Natural History* 32:1-143.
- Montanucci, R.R. 1965. Observations on the San Joaquin leopard lizard, *Crotaphytus wislizenii silus* Stejneger. *Herpetologica* 21:270-283.
- Montanucci, R.R. 1970. Analysis of hybridization between *Crotaphytus wislizenii* and *Crotaphytus silus* (Sauria:Iguanidae) in California. *Copeia* 1970:104-123.
- Morrell, S.H. 1972. Life history of the San Joaquin kit fox. *California Fish and Game* 58:162-74.
- Morrell, S.H. 1975. San Joaquin kit fox distribution and abundance in 1975. California Department of Fish and Game, Wildlife Management Branch, Sacramento, California.
- National Cooperative Highway Research Program . 2003. Design speed, operating speed, and posted speed practices. Report for the Transportation Research Board. Washington, D.C. 90 pp.
- O'Farrell, T.P. 1981. Inventory of San Joaquin Kit Fox on BLM Lands in the Western San Joaquin Valley, Final Report. Prepared for the Bureau of Land Management. Bakersfield, California.
- O'Farrell, T.P. 1984. Conservation of the endangered San Joaquin kit fox *Vulpes macrotis mutica* on the Naval Petroleum Reserves, California. *Acta Zoologica Fennica* 172:207-208.
- O'Farrell, T.P., and L. Gilbertson. 1979. Ecology of the desert kit fox, *Vulpes macrotis arsipus*, in the Mojave Desert of Southern California. *Bulletin of the South California Academy of Science* 85:1-15.
- Orloff, S.G., F. Hall, and L. Spiegel. 1986. Distribution and habitat requirements of the San Joaquin kit fox in the northern extreme of their range. *Transactions of the Western Section of the Wildlife Society* 22:60-70.
- Paveglio, F.L., and S.D. Clifton. 1998. Selenium accumulation by San Joaquin kit foxes and coyotes in the Kesterson National Wildlife Refuge Area (draft). U.S. Fish and Wildlife Service, Los Banos, California Unpublished Report.
- Pechmann, J.H.K., R.A. Estes, D.E. Scott, and J.W. Gibbons. 2001. Amphibian colonization and use of ponds created for trial mitigation of wetland loss. *Wetlands* 21:93-111.
- Petranka, J.W. 1998. Salamanders of the United States and Canada. Smithsonian Institution Press.

- [PVS] Panoche Valley Solar. 2014. Biological assessment for the Panoche Valley solar facility and appendices. November 2014.
- [PVS] Panoche Valley Solar. 2015. Biological assessment for the Panoche Valley solar facility and appendices (revised). September 2015.
- Quad Knopf, Inc. 2005. Coles Levee Ecosystem Preserve: 2004 annual report. Quad Knopf, Inc., Bakersfield, California.
- Ralls, K., and P.J. White. 1995. Annual report: kit fox-coyote relationships in the Carrizo Plain Natural Area. U.S. Fish and Wildlife Service, Sacramento, California.
- Robins, J.D., and J.E. Vollmar. 2002. Livestock grazing and vernal pools. Pages 401-430 *In* Vollmar, J.E. (Ed.). 2002. Wildlife and rare plant ecology of eastern Merced County's vernal pool grasslands. Vollmar Consulting, Berkeley, California.
- Saccheri I., M. Kuussaari, M. Kankare, P. Vikman, Fortelius, W., and I. Hanski. 1998. Inbreeding and extinction in a butterfly metapopulation. *Nature* 392:491-494.
- Schuster, E., L. Bulling, and J. Köppel. 2015. Consolidating the state of knowledge: a synoptical review of wind energy's wildlife effects. *Environmental Management* 56:300–331
- Schwartz, M.K., K. Ralls, D.F. Williams, B.L. Cypher, K.L. Pilgrim, and R.C. Fleischer. 2005. Gene flow among San Joaquin kit fox populations in a severely changed ecosystem. *Conservation Genetics* 6:25-37.
- Scrivner, J.H., T.P. O'Farrell, T.T. Kato, and M.K. Johnson. 1987a. Diet of the San Joaquin kit fox, *Vulpes macrotis mutica*, on Naval Petroleum Reserve #1, Kern County, California, 1980-1984.
- Scrivner, J.H., T.P. O'Farrell, and T.T. Kato. 1987b. Dispersal of San Joaquin kit foxes, *Vulpes macrotis mutica*, on Naval Petroleum Reserve #1, Kern County, California.
- Scrivner, J.H., T.P. O'Farrell, and K.L. Hammer. 1993. Summary and evaluation of the kit fox relocation program, Naval Petroleum Reserve #1, Kern County, California.
- Semlitsch, R.D., D.E. Scott, and J.H.K. Pechmann. 1988. Time and size at metamorphosis related to adult fitness in *Ambystoma talpoideum*. *Ecology* 69:184-192.
- Seymour, R., and M. Westphal. 1994. Final Report—Status and Habitat Correlates of California Tiger Salamanders in the Eastern San Joaquin Valley: Results of the 1994 Survey. Report prepared by the Coyote Creek Riparian Station for the US Fish and Wildlife Service, Sacramento, California.

- Shaffer, H.B., R.N. Fisher, and S.E. Stanley. 1993. Status report: the California tiger salamander (*Ambystoma californiense*). Final report for the California Department of Fish and Game, Sacramento, California.
- Shaw, W.T. 1934. The ability of the giant kangaroo rat as harvester and storer of seeds. *Journal of Mammalogy* 15:275-276.
- Single, J.R., D.J. Germano, and M.H. Wolfe. 1996. Decline of kangaroo rats during a wet winter in the southern San Joaquin Valley, California. *Transactions of the Western Section of the Wildlife Society* 32:34-41.
- Smith, H.M. 1946. Handbook of lizards. Lizards of the United States and Canada. Comstock Publishing Co., Ithaca, New York.
- Smith, S.D. 1984. Environmental effects of solar thermal power systems—analysis of plant invasion into the Barstow 10 Mile Pilot STPS. U.S. Department of Energy.
- Smith, S.D., D.T. Patten, and R.K. Monson. 1987. Effects of artificially imposed shade on a Sonoran desert ecosystem—microclimate and vegetation. *Journal of Arid Environments*, 13:65-82.
- Smith, D.A., K. Ralls, B.L. Cypher, and J.E. Maldonado. 2005. Assessment of scat-detection dog surveys to determine kit fox distribution. *Wildlife Society Bulletin* 33:897-904.
- Snow, N.P., W.F. Andelt, T.R. Stanley, J.R. Resnik, and L. Munson. 2012. Effects of roads on survival of San Clemente Island foxes. *Journal of Wildlife Management* 76:243-252.
- Spencer, K.A., W.H. Berry, W.G. Standley, and T.P. O'Farrell. 1992. Reproduction of the San Joaquin kit fox at Camp Roberts Army National Guard Training Site, California.
- Spiegel, L.K. 1996. Overview. *In: Studies of the San Joaquin kit fox in undeveloped and oil-developed areas.* California Energy Commission, Environmental Protection Office, Sacramento, California.
- Spiegel, L.K., and J. Tom. 1996. Reproduction of San Joaquin kit fox in undeveloped and oil-developed habitats of Kern County, California. *In: Studies of the San Joaquin Kit Fox in Undeveloped and Oil-Developed Areas.* California Energy Commission, Environmental Protection Office, Sacramento.
- Standley, W.G., W.J. Berry, T.P. O'Farrell, and T.T. Kato. 1992. Mortality of San Joaquin kit fox (*Vulpes macrotis mutica*) at Camp Roberts Army National Guard Training Site, California.
- Stebbins, R.C. 1985. A field guide to western reptiles and amphibians. Second edition. Houghton Mifflin Company, Boston, Massachusetts.

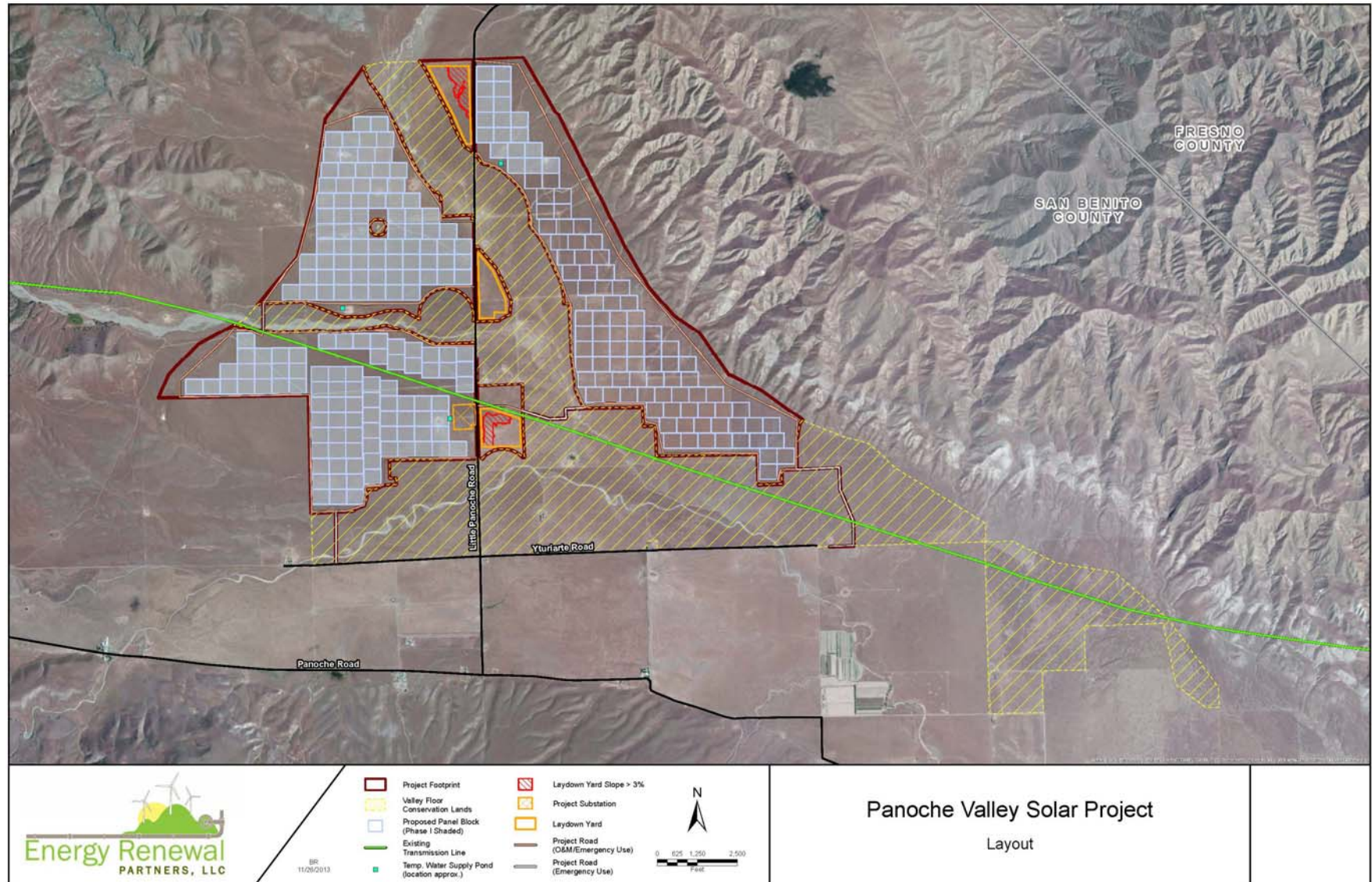
- Stebbins, R.C. 2003. A field guide to western reptiles and amphibians. Third edition. Houghton Mifflin Company, Boston, Massachusetts.
- Stejneger, L. 1893. Annotated list of the reptiles and batrachians collected by the Death Valley Expedition in 1891, with descriptions of new species. North American Fauna 7:159-228.
- Storer, T.I. 1925. A synopsis of the amphibia of California. University of California Publications in Zoology 27:1-342.
- Sugihara, N., J.W. van Wagendonk, K.E. Shaffer, J. Fites-Kaufman, and A.E. Thode. 2006. Fire in California. University of California Press, Berkeley.
- SunPower. 2010. Memorandum: impact of PV systems on local temperature. Performance Engineer. 6 July 2010.
- Tollestrup, K. 1976. A standardized method of obtaining an index of densities of blunt-nosed leopard lizards, *Crotaphytus silus*. Unpublished report to U.S. Fish and Wildlife Service, Sacramento, California.
- Tollestrup, K. 1979a. The ecology, social structure, and foraging behavior of two closely related species of leopard lizards, *Gambelia silus* and *Gambelia wislizenii*. Doctoral dissertation, University of California, Berkeley.
- Tollestrup, K. 1979b. The distribution of *Gambelia silus* (blunt-nosed leopard lizard) in the western foothills of the San Joaquin Valley. Unpublished Report, California Department of Fish and Game. Sacramento, California.
- Tollestrup, K. 1982. Growth and reproduction in two closely related species of leopard lizards, *Gambelia silus* and *Gambelia wislizenii*. American Midland Naturalist 108:1-20.
- Tollestrup, K. 1983. The social behavior of two closely related leopard lizards, *Gambelia silus* and *Gambelia wislizenii*. Zeitschrift fur Tierpsychologie 62:307-320.
- Trenham, P.C. 1998. Demography, migration, and metapopulation structure of pond breeding salamanders. Unpublished Ph.D. dissertation. University of California, Davis.
- Trenham, P.C. 2001. Terrestrial habitat use by adult California tiger salamanders. Journal of Herpetology 35:343-346.
- Trenham, P.C., and H.B. Shaffer. 2005. Amphibian upland habitat use and its consequences for population viability. Ecological Applications 15:1158–1168.
- Trenham P.C., H.B. Shaffer, W.D. Koenig, and M.R. Stromberg. 2000. Life history and demographic variation in the California tiger salamander. Copeia 2000:365-377.

- Trenham, P.C., W.D. Koenig, and H.B. Shaffer. 2001. Spatially autocorrelated demography and interpond dispersal in the salamander *Ambystoma californiense*. *Ecology* 82:3519-3530.
- Twitty, V.C. 1941. Data on the life history of *Ambystoma tigrinum californiense*. *Copeia* 1941:1-4.
- Upham, N.S., and J.C. Hafner. 2013. Do nocturnal rodents in the Great Basin Desert avoid moonlight? *Journal of Mammalogy* 94:59–72.
- Uptain, C., W.A. Clark, and S.M. Juarez. 1985. Mark-recapture population estimates and visitation indices for the blunt-nosed leopard lizard, *Gambelia silus*, at the Pixley National Wildlife Refuge. U.S. Fish and Wildlife Service, Delano, California.
- [Service] U.S. Fish and Wildlife Service. 1967. Native fish and wildlife endangered species. *Federal Register* 32(48):4001.
- [Service] U.S. Fish and Wildlife Service. 1980. Listing the valley elderberry longhorn beetle as a threatened species with critical habitat. *Federal Register* 45(155):52803-52807.
- [Service] U.S. Fish and Wildlife Service. 1995. Biological opinion for the reinitiation of formal consultation concerning oil production at the maximum efficient rate on Elk Hills Naval Petroleum Reserve, Kern County, California. Service File # 1-1-95-F-102. Sacramento, California.
- [Service] U.S. Fish and Wildlife Service. 1998. Recovery plan for upland species of the San Joaquin Valley, California. Region 1. Portland, Oregon.
- [Service] U.S. Fish and Wildlife Service. 1999. U.S. Fish and Wildlife Service standardized recommendations for the protection of the San Joaquin kit fox prior to or during ground disturbance. [http://www.cfwfs.gov/sacramento/es/documents/kitfoxstandard rec.PDF](http://www.cfwfs.gov/sacramento/es/documents/kitfoxstandard%20rec.PDF)
- [Service] U.S. Fish and Wildlife Service. 2000. Endangered and threatened wildlife and plants; final rule to list the Santa Barbara County distinct population of the California tiger salamander as endangered. *Federal Register* 65:57241-57264.
- [Service] U.S. Fish and Wildlife Service. 2003. Endangered and threatened wildlife and plants; determination of endangered status for the Sonoma County distinct population segment of the California tiger salamander; final rule. *Federal Register* 68:13497-13520.
- [Service] U.S. Fish and Wildlife Service. 2004. Endangered and threatened wildlife and plants; determination of threatened status for the California tiger salamander; and special rule exemption for existing routine ranching activities. *Federal Register* 69:47212-47248.
- [Service] U.S. Fish and Wildlife Service. 2010a. Giant kangaroo rat (*Dipodomys ingens*) 5-year review: summary and evaluation. U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California.

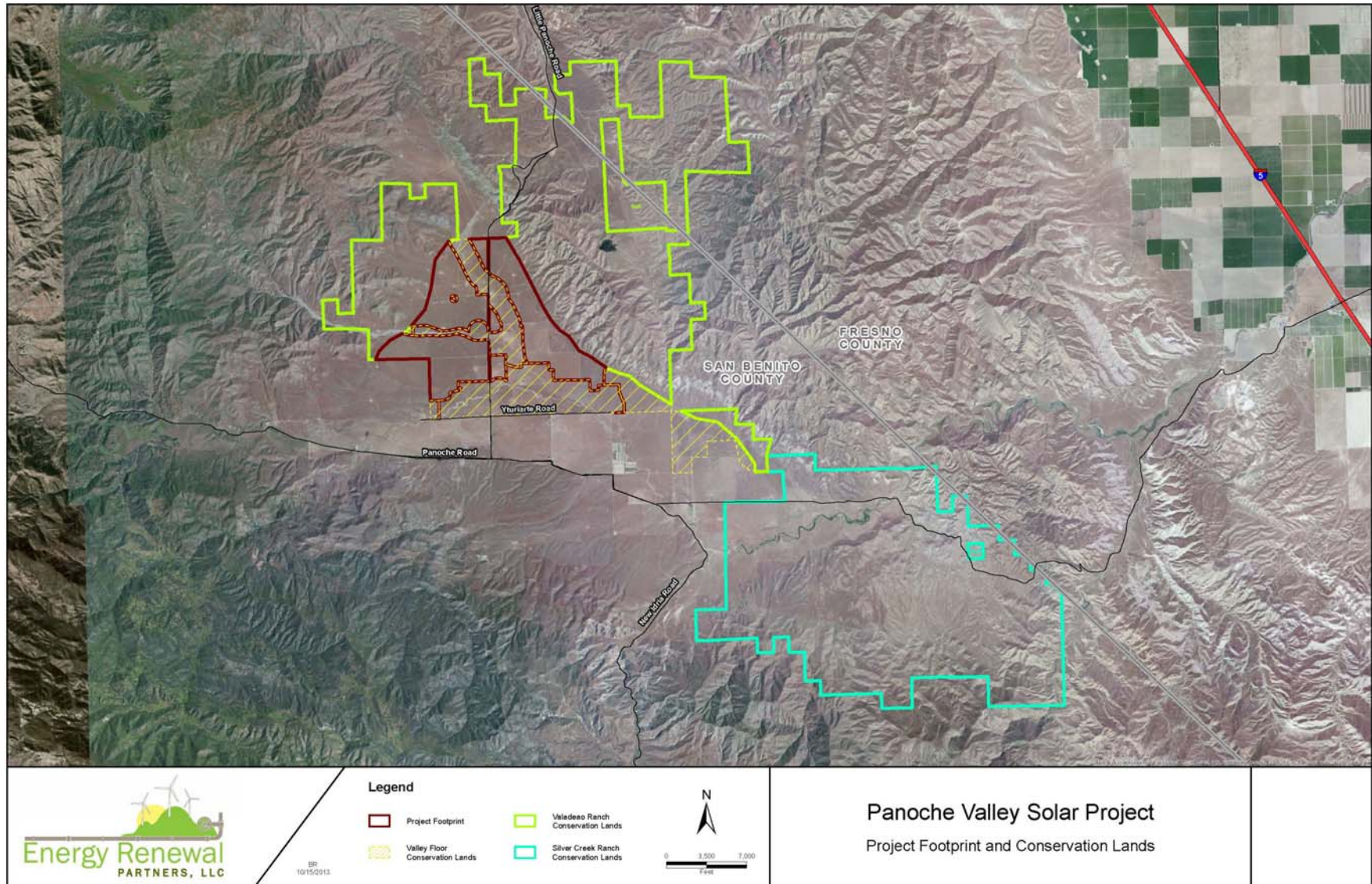
- [Service] U.S. Fish and Wildlife Service. 2010b. Blunt-nosed leopard lizard (*Gambelia sila*) 5-year review: summary and evaluation. U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California.
- [Service] U.S. Fish and Wildlife Service. 2011a. Standardized recommendations for the protection of the endangered San Joaquin kit fox prior to or during ground disturbance. Sacramento, California.
- [Service] U.S. Fish and Wildlife Service. 2011b. Biological Opinion on the Proposed California Valley Solar Ranch, San Luis Obispo County, California. Service File #81420-2011-F-0511. Sacramento, California. June 24, 2011.
- [Service] U.S. Fish and Wildlife Service. 2015. California condor location data. Ventura, California.
- Vernon J., P. Herman, and E. Peterson. 1971. Cochlear Potentials in the Kangaroo Rat, *Dipodomys merriami*. *Physiological Zoology*, Vol. 44(2):112-118.
- Warrick, G.D. 2006. Lokern and Semitropic Ridge Preserves. 2005 Annual Report. Center for Natural Lands Management.
- Warrick, G.D., and B.L. Cypher. 1998. Factors affecting the spatial distribution of San Joaquin kit foxes. *Journal of Wildlife Management* 62:707-717.
- Warrick, G.D., T.T. Kato, and B.R. Rose. 1998. Microhabitat use and home range of blunt-nosed leopard lizards. *Journal of Herpetology* 32:183-191.
- White, P.J., and R.A Garrott. 1997. Factors affecting kit fox populations. *Canadian Journal of Zoology* 75:1982-1988.
- White, P.J., and R.A Garrott. 1999. Population dynamics of kit foxes. *Canadian Journal of Zoology* 77:486-493.
- White, P.J., and K. Ralls. 1993. Reproduction and spacing patterns of kit foxes relative to changing prey availability. *Journal of Wildlife Management* 57:861-867.
- White, P.J., C.A. Vanderbilt White, and K. Ralls. 1996. Functional and numerical responses of kit foxes to a short term decline in mammalian prey. *Journal of Mammalogy* 77:370-376.
- Wilbur, H.M., and J.P. Collins. 1973. Ecological aspects of amphibian metamorphosis. *Science* 182:1305-1314.
- Williams, D.F. 1990. Assessment of potential habitat for the blunt-nosed leopard lizard and San Joaquin kit fox in western Madera County, California. U.S. Fish and Wildlife Service, Sacramento, California.

- Williams, D.F. 1992. Geographic distribution and population state of the giant kangaroo rat, *Dipodomys ingens* (Rodentia, Heteromyidea). In: Endangered and sensitive species of the San Joaquin Valley, California: their biology, management and conservation (D.F. Williams, S. Byrne, and T.A. Rado, editors). California Energy Commission, Sacramento, California.
- Williams, D.F., and D.J. Germano. 1992. Recovery of the blunt-nosed leopard lizard: past efforts, present knowledge, and future opportunities. Transactions of the Western Section of the Wildlife Society 28:38-47.
- Williams, D.F., and D.J. Germano. 1994. Population responses of *Dipodomys ingens* to fluctuating precipitation during a 7.5-year period. Presented to the 75th Annual Meeting of the American Society of Mammalogists, Washington, D.C.
- Williams, D.F., D.J. Germano, and W. Tordoff III. 1993. Population studies of endangered kangaroo rats and blunt-nosed leopard lizards in the Carrizo Plain Natural Area, California. California Department of Fish and Game. Nongame Bird and Mammal Section Report 93-01:1-114.
- Williams, D.F., M.K. Davis, and L.P. Hamilton. 1995. Distribution, population size, and habitat features of giant kangaroo rats in the northern segment of their geographic range. Prepared for California Department of Fish and Game, Wildlife Management Division, Bird and Mammal Conservation Program, Sacramento, California.

Appendix A. Proposed project footprint.



Appendix B. Proposed project conservation lands.



Appendix C. Proposed stream crossings.

